DIRECTORATE GENERAL OF HEALTH SERVICES
GOVERNMENT OF INDIA

REVIEW OF TRAINING IN EPIDEMIOLOGY

NATIONAL INSTITUTE OF COMMUNICABLE DISEASES
22 - SHAM NATH MARG, DELHI-110054
1987

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REVIEW OF TRAINING IN EPIDEMIOLOGY

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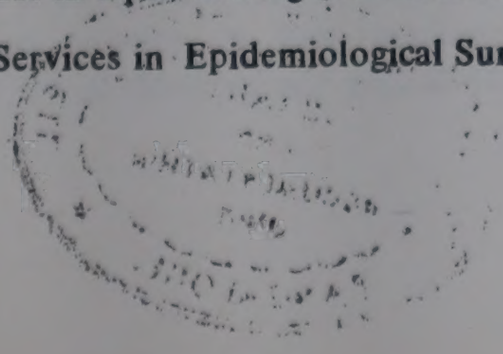

PREFACE

The National Institute of communicable Diseases (NICD) has the destinetion of being one of the fore most institution imparting inservice training courses in Epidemiologo to State and District level Medical officers and teachers. During past two decades this institution has been conducting mainly two types of epidemiology courses.

(a) W.H.O. Regional training courses in epidemiology and control of communicable diseases of 3 months duration.

(b) National courses in epidemiology of 72 working days duration.

Since 1985 this later course has been replaced with a shorter course of 21 days duration to enable the state health authorities to nominate more candidates for training in epidemiology every year.

All traning courses need updating or modification to accommodate recent advances in science & technology and changing health needs and programmes. This institute has been sensitive to this important aspect. In the 'National workshop on epidemiology' held here from 29th october to 2nd November 1979, training needs and facilities were discussed in some detail with particular emphasis on epidemiological surveillance. In its deliberation the group identified the training needs at various levels of health infrastructure. The group recommended that the 'Training programme for each category of health and medical workers should be reviewed and the amount and kind of training in epidemiology that need to be imparted should be specified for every category.

In view of above, on behalf of the Directorate General of Health services, NICD, has conducted a workshop from 21-24 october 1986 to review training in epidemiology. Experts were drawn from various related fields of epidemiology, health administrators and teachers were also involved. Proceedings and recommendations of the workshop are presented in this booklet. This booklet also contains some articles on training in epidemiology which describe the current status of epidemiologioal services, quality of training currently available in India at undergraduate and post graduate level etc. Some experts from international agencies like WHO and USAID have contributed articles in this booklet that shall provide a global perspective and future thinking and plan for training.

Dr. P.N. Sehgal
Director
National Institute of
Communicable Diseases

1. WORKSHOP ON REVIEW OF TRAINING IN EPIDEMIOLOGY (REPORT AND RECOMMENDATIONS)

On behalf of the Directorate General of Health Services, National Institute of Commnicable Diseases held a national workshop on review of training in epidemiology from 21-24 October, 1986.

1.1 Need for review

Epidemiological services is an intergral part of primary health care. One of the most remarkable strategies for attainment of goal of health for all by 2000 A.D. as formulated in India's national health policy is to strengthen epidemiological services. The policy emphasised the need for establishing a nation-wide net work of epidemiological station between Primary and Secondary level of health services manned by trained staff equipped to identify plan and provide preventive, promotive and mental health care services. To translate these policy statements into action a number of national meetings have been held on development of epidemiological services. In the national workshop on development of epidemiological services (December 1984), organisational set up and function of epdemiological services at state and district level were defined. The states have agreed in principle to implement the programme. The proposed organisational set up requires large number of cohesive teams of medical and paramedical personnel appropriately trained in epidemiological methods and practices. Various Training courses in epidemiology are available in India. Unfortunately however, the training programme in the country is far from adequate. Not only very few centres in the country provide training in epidemiology, the existing facilities fail to attract large number of committed people to this discipline. Hence a review of Epidemiological Services, quality of training and infrastructural facilities available become imperative especially in view of time bound nature of our national commitment. This review is also necessary in the light of WHO expert committee guidelines on reform of educational programme, which has lot of relevance in Indian context. Reference to some of these are made below :

(a) The educational system leading to the development of health personnel at all levels must be re-examined within the context of the needs of the country concerned.

(b) An educational programme instead of being the result of non-selective accumulation of knowledge built up over centuries must be shaped selectively in terms of goals to be achieved. If that goal is modified in course of time, the programme must also be modified accordingly.

(c) There can be no question of continuing to copy the modules of the past or in the case of developing countries foreign models.

(d) The members of the health team must be trained specifically for the tasks they will have to perform taking into account the circumstances under which they will work.

1.2 Objective

The workshop to review the training in epidemiology in India has been organized with following specific objectives :

(i) Review of status of epidemiologial services in India :

(ii) Review of inservice, undergraduate, postgraduate and refresher's training programme and current training needs.

(iii) To review the existing facilities for imparting training and to support steps for strengthening the same.

(iv) To formulate and plan for the integrated development of teaching and practice of epidemiology.

(v) Modification of training curriculum and methodology in the light of national health policy (guidelines).

(vi) To consider the need for career prospects of epidemiologists and incentives.

1.3 Organization of Workshop

The workshop was attended by experts from various disciplines including those from Directorate of Health Services of the States, Medical Colleges, Directorate General of Health Services and agencies like Indian Council of Medical Research (ICMR), New Delhi, All India Intitute of Hygiene and Public Health, Calcutta, National Institute of Health and Family Welfare, New Delhi, Central Bureau of Health Intelligence, National Institute of Communicable Diseases, Delhi and Municipal Corporatiou of Delhi. The meeting was opened by Dr. Harcharan Singh, Advisor (Health), Planning Commission.Dr. N.K. Shah, Director, WHO, SEARO was Chief guest. Summary of their address are presented separately in this pamphlet.

Following background materials were distributed among the participants for reference and discussion.

(i) National Health Policy, Govt. of India.

(ii) Educational Handbook for Health personnel, WHO Expert Committee.

(iii) Report of thn National Workshop on Epidemiology held at the National Institute of Communicable Diseases, Delhi. 29th October to 2nd November, 1979.

(iv) Development of epidemiological services, Directorate General of Health Services, Govt. of India, 1985.

(v) Progress in the development of Epidemiological Services Directorate General of Health Services, Govt. of India, March, 1986.

(vi) Training in Epidemiology in India : Current Status and Needs Sharma R.S., J. Ind. Med. Assoc. Vol. 82 No. 10 Oct. 1984 pp 382-284.

(vii) Revew of Epidemiological Services and training In India-Unpublished working paper prepared by Dr, Mahendra Dutta.

(viii) Training needs at different levels in the light of National Health policy-Unpublished working paper by Dr. PN. Sehgal, Director National Institute of Communicable Diseases, Delhi.

1.4 Programme Resume

The programme consisted of introductory lectures, panel and group discussions. The first day was devoted to lecture discussions on various aspects of epidemiological services and training. The Panel discussions were held on current status and lacunae in undergraduate, postgraduate and inservice training programmes in India. Following these introductory sessions two working sub-groups were constituted for discussion and drafting of reports and recommendations on the following objectives :

Group I was to review the existing epidemiological services at Centre, State, District and PHC level and to suggest improvements to strengthen the same in the context of National Health Policy.

Group II was to review the existing training programme in epidemiology for undergraduates, post-graduates and inservice training for medical officers and para-medical workers. Also this group is to suggest measures for strengthening these training programme.

1.5 Reports and recommendations

After the group discussions were completed, the reports prepared by the groups were presented by respective chair persons in a joint session when the specific recommendations were extensively discussed and appropriate modifications made. The final report thus prepared is presented in the following pages.

1.5.1 Working Sub-group—I

1. Dr. P.C. Vyas, Director General of Health Services, UP (Chairman)
2. Dr. P.N. Sehgal, Director, National Institute of Communicable Diseases.
3. Dr. Mahendra Dutta, Dy. Director General (P), Dte. General of Health Services.
4. Dr. K.P. Dutta-Dy. Director Health Services, Delhi Administration.
5. Sri V.P. Bhasin-Central Bureau of Health Intelligence.
6. Dr. R.D Bansal, Prof. Deptt. of P.S.M., Lady Hardinge Medical College.
7. Dr Krishna Ray, Asstt. Director, NICD, Delhi.
8. Dr. R.K. Misra-Dy. Director Health Services, Madhya Pradesh.
9. Dr. V.N. Seth, Epidemiologist, Municipal Corporation of Delhi.
10. Dr. A.K. Chatterjee, Senior Medical Officer, NICD, Delhi.
11. Dr. L B S. Dey, Senior Medical Officer, NICD, Delhi.
12. Dr. R.S. Shrama, Asst. Director, NICD, Delhi-(Rapporteur).
13. Dr. T.D. Sharma, Dy. Chief Medical Officer, Dharamshala, H.P. (Rapporteur).

Objective of the sub-group—I

1. To review the existing status of epidemiological services at various levels and to suggest its development to meet the objective of Health for All by 2000 A.D. as defined in the National Health Policy.
2. To review the career prospects of epidemiologists at various level and make recommendations.

1.5.1.1 Review & recommendations on Epidemiological Services

Working sub-group-I consulted the background papers and reviewed the epidemiological services. Deleberation of the group brought out the following salient points :—

(i) Organizational pattern of epidemiological units at state and district level recommended by the national workshop on development of

epidemiological services (Dec. 1984) is appropriate. This Organisational set up for epidemiological services has not come into existence in most of the States due to multifarious reasons.

(ii) The diseass surveillance has remained very weak. Existing surveillance is mainly limited to institutional data on diseases. Community based data is lacking. In any case information furnished by State/UT's is only provisional/incomplete and not comparable.

(iii) Various organisations involved in surveillance and training (in epidemiology) are functioning in total isolation.

(iv) The Group in view of important vector-borne diseases felt the need for entomological support at State and district level as an essential component of epidemiological unit.

(v) Laboratory support services for carrying out epidemiological investigation at State, District and PHC level is very inadequate in term of facilities epuipment and trained manpower.

(vi) The epidemiological Unit at district level do not have a statistical set up. The processing of the data at state and district level is delayed ; and more significantly lack of timely feed back also adversely affects data input.

(vii) The epidemiological investigation is seriously impeded by lack of adquate mobility (transport) and other communication facility. Routine epidemiological surveillance is also indirectly affected.

(viii) There is a shortage of professional epidemiologist in Govt. Health Services. Limited career opportunity, lower social and financial position than that available to the clinical colleagues are some of the reasons.

1.5.1.2 Existing epidemiological services at different level, its lacunae and recommendations as prepared by the sub-group is presented below

1.5.1.3 Central Level

CBHI

At the Directorate General of Health Services, there is Central Bureau of Health Intelligence headed by a Director of the rank of A.D.G. The bureau is responsible for collecting, compil ng, analysing and publishing the data on communicable diseases. The data received from the States/ Union Territories is usually based on patients treated in medical institutions and does not always include field data. The information furnished by the States/UT's is provisional/incomplete and not comparable due to ill defined coverage.

At present, there is no officer at the Central level responsible for epidemiological services and it is felt that for eflective coordination of various organisations involved in the epidemiological surveillance and training, a post of Senior level officer directly responsible to the Director General of Health Services with the supporting staff may be created.

The NICD, Delhi, which is carrying out/assisting the states in epidemiological investigation of outbreak of epidemic in various parts of the country and organizing training in epidemiology should have coordination with the similar agencies doing the epidemiological investigation work. The brancnes, of NICD should be more effective, augmenting the surveillance. ICMR is helping through research, control of outbreaks of epidemic prone diseases. There is need for proper linkage between ICMR, National Institutes and States level Organizations.

1.5.1.4 Epidemiological Services at State Level

It was felt that different states have some sort of skeleton organization at persent looking after the epidemiological services. There is no proper monitoring, analysis and feed back. This set up is different for different states. Some states have epidemiological services cell with well defined staff and infrastructure ; many others do not have that. The group recommends that at state level there should be a full fledged epidemiological division headed by a qualified epidemiologist who should be senior officer or at least an officer who has some training in epidemiology in the NICD or similar Institute. Pending the creation of the post of State epidemiologist, a senior officer can be identified to look after the epidemiology work. States which are not having this type of set up should take action to have one. The followlng functions for State level epidemiological unit were identified :

(i) Collect, compile, scrutinise analyse and disseminate the data on health and disease collected on a regular basis for improvement of health.

(ii) Investigate disease outbreaks rapidly so that control measures can be taken timely and adequately.

(iii) Establish linkage with the laboratory facilities available in medical college/hospital/special institute for necessary diagnostic support for epidemiological investigations.

(iv) Keep contact with specific disease programme officer/local health officer for exchange of data and immediate action when and where necessary.

(v) Organise field surveys to monitor and evaluate disease control programmes and analyse health situation.

(vi) Develop sentinel centres by organizing medical record section in selected hospitals.

(vii) Train district and PHC medical officers and statisticians in tools and techniques of epidemiology.

(viii) Provide feed back to all, including administrators through newsletter.

(ix) Assist policy makers in detection of new problems, identification of priority health problems and adopt cost effective approaches.

(x) Collaborate with other agencies and institutes for carrying out operational studies/health programme in the area.

The group more or less agreed with the organizational pattern of State epidemiological unit as given in the book "Development of epidemiological services"—NICD publication 1985, and recommends the same with the addition of Entomological Unit as shown below :

State Epidemioloigst

Field Epidemiology Unit	Health Intelligence Unit.	Public Health Laboratory	Entomological Unit.
Epidemiologist			
Field Investigators.	Statistical Officer		Entomologist
	Statistical Investigator		Entomological Assistant
	Statistical Assistant		Insect Collectors.
	Programmer.		

Entomological support for the epidemiological services is lacking at the district as well as zonal and state levels. Only zonal malaria organisations are having entomological units attached to them. These units either may be utilised for other epidemiological work or a separate entomological unit should be provided at the sate level. Adequate *transport support* is essential to improve mobility.

Selected Medical Colleges should be actively involved in providing laboratory support and expertise in control of outbreak and other containment measures for the states.

Computerisation of health intelligence system.

Health intelligence forms the important component of epidemiological services. This group felt that the data collected being so vast in terms of

variables and number of reporting units that the services of computers are essential at State level and may be small *micro-computers at distirict level.* A beginning in this direction has already been made at the Central level in the Central Health Intelligence Bureau.

For this trained manpower is essential ; for which help of CBHI or other central training institutes can be taken, who in phased manner can train personnel from states and districts.

1.5.1.5 District Level

At present, there is no epidemiological surveillance and services set up at district level except for the statistical units manned by statistical assistants who are compiling the morbidity data received from PHCs and medical institutions within the district and sending it to state headquarters on prescribed froms. The officers looking after this job are different in different states. It was felt that there should be active involvement of CMOs, Deputy CMOs, DHOs for making them aware about the importance of epidemiological surveillance by giving them training at the NICD, or in the medical colleges. It is desirable that there should be a separate post of epidemiologist in each district health organisation for analysis, interpretation and dissemination of the data. This set up is specially recommended for taking care of those diseases not covered under various national health/ disease control programmes. Such diseases may be of public health importance and epdemices at district level with special reference to epidemic prone diseases were conducted by NICD recently. Findings of the study may be utilised for wider application. They have identifid that items like stationary, POL and T.A. need be provided as per need. At District level, there should be close liasion of district health organization with non-governmental organisation like private practitioners and private hospitals and Nursing homes. Some system is to be evolved through which the non-government institutions send reports of morbidity and mortality to district health organization.

The group recommends the following functions for the District Epidemiological Unit.

(i) To collect, compile and analyse the information of diseases received from the periphery and transmit the same to state level and to provide feed-back to the PHC once a month.

(ii) To device measures for control of diseases and issue specific guidelines to the peripheral level, namely the PHC and sub-centres.

(iii) To visit the areas of endemicity and higher prevalence to assess the control and preventive measures to be taken.

(iv) To provide training to peripheral workers including medical officers, involved in the control and prevention of disease prevalent in the district or likely to occur in epidemic proportion from time to time. The group suggests inclusion of childhood diseases, diarrhoeal diseases, hepatitis, polio, enteric fever, measles, meningococcal meningitis, rabies, blindness, and other diseases of local and National importance, in the training curriculum.

(v) To carry out analysis of water and food samples regularly.

(vi) To provide epidemiological support at short notice for diseases having high prevalence rate, also to identify long-term requirement including the finance, and prepare suitable plan of action.

(vii) To carry out investigation of disease outbreak for immediate containment measures.

(viii) To provide laboratory supoort for the proper investigation of epidemics.

The Group also recommended the following Organizational set up for the District Epidemiological Unit.

District Epidemiologlst

Field Epidemiology Unit.	**Statistical Unit.**	**Public Health Lab.**
Medical Officer	Statistical Officer	Microbiologist
Health Supervisor	Statistical Investigator	Biochemist
Health Worker	Statistical Asstt.	Lab. Technician
Draftsman		Lab Assistant.

The number of posts of different category may vary from district to district depending upon the reporting units. Adequate transport to improve mobility is also required at district level.

1.5.1.6 Primary Health Centres

The group identified the following functions for the primary health centres in relation to epidemiological work.

(i) To supervise the work of various categories of health workers.

(ii) To collect regular information on health from the entire area and analyse them to maintain a watch on the health situation and take appropriate corrective action whenever needed.

(iii) To ensure that all necessary steps are taken to prevent the spread and control of communicable disease including support at district and state levels.

(iv) To take necessary action for containment in case of any outbreak of communicable diseases.

(v) To send regular reports and returns to the next higher level and provide feed-back to the workers at PHC level.

1.5.1.7 Para-Medical Workers

Para-medical worker should take part in active surveillance of epidemic prone diseases through lay reporting system. He should have knowledge of elementary containment measures and basic knowledge of collection and trnsporation of common laboratory samples. He also should be able to assist the health authorities in control of epidemics and conducting of surveys. The group suggests that the pre-service training curricula of MPWs (male and female) and Village-Guides should be reviewed. A separate Expert Group may be constituted to verify whether enough epidemiological component is there in the curricula, and suggest modification.

1.5.1.8 Public Health Laboratory Services in Support of Epidemiology Services

At present, the public health laboratory services at State, District and PHC levels are very inadequate in terms of facilities equipments and trained manpower. The laboratory services are very important for effective epidemiological work. The group recommends that a sub-committee or a workshop to go into the details of laboratory services may be convened by the Director, NICD, Delhi. The workshop will review the existing laboratory services at primary health care level and make recommendations.

The Group identified the following functions of Public Health Laboratory which are essential to support the epidemiological services.

1. To acquire specific and reliable information on health problems in the country.
2. Serological surveys.
3. Haematological surveys.
4. Study of environmental health.
5. Cytological screening of population.
6. Investigation and epidemiology of drug dependance.
7. Vaccine testing.

8. Publication of findings.
9. Examination of food handlers.
10. Quality control of food, water and products of public health importance.
11. Assistnce to forensic investigations.

1.5.1.9 Career Prospects for Epidemiologists

The Group recommends the following prospects for epidemiologists at different levels.

A. At State level, there should be a specialist in epidemiology as State Epidemiologist.

B. At District level, there should be a Districct Epidemiology Officer (Class-I) to assist district Health Officer in epldemiological work. This officer could be given following incentives so that he stays on to this post and does the job assigned to him with interest.

(i) His services in epidemiology at the district level should be given weightage at-par with rural services for selection in postgraduation.

(ii) District epidemiologists should have equal opportunity for higher promotion as in other attractive clinical specialities.

(iii) A special allowance can be given to doctor working in epidemiology.

(iv) This person can be considered for fellowships abroad on priority basis.

C. There should be appropriate incentives (stipend) in training (short or long) in epidemiology.

D. State/Central Government should give additional increment to the officers successfully completing one year training in epidemiology.

1.5.2 Working Sub-group—II

1. Dr. A.K. Chakraborty, Prof. Social & Preventive Medicine, A.I.I.H.P.H. (Chairman).
2. Dr. C.K. Rao, Deputy Director General, Delhi.
3. Dr. A.K. Govila, Prof. P.S.M., Gwalior.
4. Dr. N.D. Dutta Banik, Dy. Director General, ICMR, Delhi.
5. Dr. V.N. Misra, Prof. & Head of Social & Preventive Medicine, Meerut.

6. Dr. K.B, Banerjee, Dy. Director (Epidemiology), NICD, Delhi.
7. Dr. R. Rajagopal, Dy. Director (Med. Entomology), NICD, Delhi.
8. Dr. Rajesh Bhatia, Asstt. Director (Zoonosis), NICD, Delhi.
9. Dr. S.N. Bahadur, Cheif Medical Officer, Ghaziabad.
10. Dr. S.K. Das, Senior Medical Officer (Epidemiology) NICD, Delhi.
11. Dr. J.P. Narain, Asstt, Director (Epidemiology), NICD, Delhi. Rapporteur.
12. Dr. R.K. Shamal, Officer-in-Charge. R.H.F.W.T.C., Najafgarh.

Objective of Sub-group

1. To review the undergraduate, post-graduate and inservice training in epidemiology for Medical Officers and Para-medical workers ; and
2. To suggest additional training programme and modification of existing training programme for these personnel.

1.5.2.1 Report and recommendations on training.

The group II first reviewed existing under-graduate, post-graduate and in-service training programmes for medical personnel in the country. It was felt that teaching of epidemiology in undergraduate medical course is not satisfactory. Teaching of epidemiology is left to the department of the Preventive and Social Medicine in Medical Colleges. Teachers of other disciplines do not take initiative in teaching of epidemiology of the diseases, as they themselves are not trained in Epidemiology.

Although in the Reorientation of Medical Education Scheme (ROME) students and interns are posted in the health centre area they are not exposed to the community in an effective way. Even during field work, there is no guidance from faculty. Besides the teachers of preventive and Social Medicine (PSM), teachers of other departments such as Paediatricts, Gynaecology and Obstetrics, Medicine do not accompany the students during the field work. Hence students lose interest in the field work and consider rural posting unnecessary and even wastage of time.

1.5.2.2 Postgraduate Training

Large number of medical colleges in the country are conducting MD courses in PSM and several institutions are conducting DPH/DMCW courses. It is well known that department of PSM in many medical colleges are not adequately staffed. The department needs strengthening in respect of faculty as well as physical facilities.

Post graduate training curriculum as recommended by Medical Council of India (MCI) is considered adequate and thus does not require major changes. It is however strongly felt that practice aspect in epidemiology training is neglected. Efforts are needed to expose the postgraduate students to disease surveillance and survey to make a community diagnosis and investigation of outbreaks. Close co-operation is needed between State Health Directorate and PSM departments of Medical Colleges so that in the event of any outbreak, assistance of the department is sought and department can promptly undertake investigation with the help of post-graduate students. Students should be able to analyse the surveillance data. These measures will enhance the analytic skills of post-graduate students.

Other postgraduate course in epidemiology

D.Sc./Ph.D in Epidemiology/Public Health.

Some institutions such as AIIHPH and JNU conduct D.Sc./Ph.D. courses in epidemiology/community health. These are essentially research degrees. The number of students admitted to these courses are very small. Since Epidemiological research is an important area, these courses may be encouraged.

Diplomate in Epidemiology by National Board of Examination (NBE)

The NBE was holding examination for Diplomate in NBE, but this was discontinued. The examination may be revived and should be made open to those candidates who have had adequate experience in epidemiological work.

1.5.2.3 Inservice Training

A new training programme in Epidemiology of 3 weeks duration is currently being conducted at the National Institute of Communicable Diseases, Delhi (NICD), All India Institute of Hygiene & Public Health, Calcutta (AIIH & PH), Rural Institute of Health & Family Welfare, Gandhigram (RIH & FW). The purpose of this course is to furnish essential knowledge and skill in epidemiology to the district level officers on epidemiological surveillance and investigation in an effective manner. NICD has already conducted 4 such courses with 30 participants in each. AIIHPH Calcutta and RIH & FW, Gandhigram have also conducted one course each. The group is of the opinion that since large number of district level officers are to be trained within a short period, three-weeks inservice training currently being conducted is very relevant and should be continued. Training courses in epidemiology or specific diseases are conducted at NICD and ICMR Institutions.

Different categories of health personnel to be trained in Epidemiology and nature of training

Training of different categories of health personnel in epidemiology depends on the type of jobs each category is expected to perform. Job description of each category of health personnel has been spelt out in earlier workshops begining from Multipurpose Health Workers (MPHW) to professional epidemiologists. Whereas a multipurpose health worker is to have knowledge of epidemiology of important diseases, method of collection of samples, measure for containment ; the professional epidemiologists are to plan, implement and evaluate health programmes, as well as design and carry out research work.

Professional Epidemiologists are required in.

(a) Central and State Health Directorates,

(b) Department of Preventive & Social Medicine,

(c) Public Health Institutions and

(d) Research Institutions involved in epidemiological research.

Professional epidemiologists should undergo an academic course such as M.D. or Ph.D in Epidemiology.

District/Zonal Health Officer.

They have a key role in planning, implementing and evaluating health programmes. Hence they should have a thorough grounding in Public Health, particularly in Epidemiology. They should be asked to collect and interpret data. They must possess post-graduate public health qualifications.

Medical Officers at PHC

Since undergraduate training is not adequate for epidemiological work, PHC medical officers need short orientation training in Epidemiology. Disease surveillance and investigation of outbreaks are essential functions of Medical Officers at PHC.

Health Assistants and Block Extention Educators

At present, outbreaks are not promptly notified and reports of outbreaks are received from agencies other than health. The main reasons for non-reporting of out breaks is that health workers do not make regular visits according to prescribed schedule. Health Assistants and Block Extension Educators should be made responsible in collecting and completion of morbidity and mortality data. These two categories of workers, if properly trained can improve the epidemiological work at PHC level.

Training of Multipurpose Health Workers

The group is of the opinion that no special training in epidemiology is needed for MPWs. However the Principal or one member of RHFWTC faculty will attend monthiy meetings at PHC and discuss with MPWs about the importance of diseases surveillance in control of communicable diseases.

Clinicians

Clinicians should be able to recognise the role of epidemiology as that relates to their own work. The training will be directed towards epidemiological methods so that clinicians develop necessary skills in designing epidemiological studies and helping in better decision making. The training in clinical epidemiology may be conducted in specialised institutions where there is a well-organized department of epidemiology. These institutions will have co-operation with teaching hospitals for clinical case study. The training may be of two types. 'Short-term' and 'Long-term'. Short-term course may be for a period of 3-days for the senior clinicians and this course may be conducted at NICD and AIIH & PH. The curiculum of this short training should include epidemiological methods with particular reference to clinical epidemiology. A certificate course on clinical epidemiology may be conducted at AIIH & PH andNICD for a period of 3 months.

Training for Laboratory Technicians

A training course of three weeks duration for the Laboratory technicians are being conducted at NICD and AIIH & PH. The course has been designed to support epidemiological services. The group recommends continuation of these courses'

Training of Entomologists

Vector-borne diseases are widespread and importance of trained entomologist at the district level cannot be overemphasised. Training in entomology is to be imparted at suitable centres such as NICD, Delhi, ICMR institutions.

1.5.3. Recommendations

Considering the training need of health personnel of different categories and existing training facilities present in the country, the Group recommends the following—

(a) All Central, State and District level officers connected with public health and programme officers should have post-graduate qualifications in Public Health.

(b) In all Medical Colleges, Epidemiology Units should be established in the departments of Preventive and Social Medicine and persons heading the Units should be trained in epidemiology.

(c) All Research Institutions involved in Epidemiological Research should have trained epidemiologist.

(d) Department of PSM conducting MD course should be adequately staffed.

(e) Transport facilities should be provided to the department of PSM for field work.

(f) Rural Health & Family Welfare Training Centres should have adequate staff so that it can provide training to different categories of health personnel.

(g) Teachers of department of PSM in Medical Colleges being accustomed to didactic lectures, should undergo orientation training in epidemiology for a period of 3 weeks in national institutions such as NICD Delhi, AIIH & PH, Calcutta and RIH & FW Gandhigram.

(h) Undergraduate and postgraduate medical students should be adequately exposed to the community through well designed field training programme. Students should be able to handle data generated in the health centres as well as collected from the field. Compilation and analysis of data should be done by students under the guidance of faculty.

(i) During the post-graduate training, students should get opportunity to investigate outbreaks under the guidance of faculty of PSM.

(j) Post, graduate medical students should be exposed to national health programmes, and also the methods for planning and evaluation of those programmes.

(k) Postgraduate medical students should be acquainted with reasarch methodology in epidemiological studies.

(l) The uniformity in DPH/DMCW training should be maintained with all the Institutions. It may be ensured that DPH students get opportunity to investigate outbreaks which may occur during the period of training.

(m) Examination for 'Diplomate in Epidemiology' conducted by NBE should be revived. Only those medical officers who have adequate field experience will be allowed to appear in the examination.

(n) All district and Zonal level health officers should possess post-graduate public health qualifications. As a short-term measure they should undergo 3-weeks training in Epidemiology at NICD, AIIH&PH, RH&FW Instute, Gandhigram.

(o) Orientation training for 2-weeks is to be organised at Rural Health and Family Welfare Training Centres for Medical Officers of PHCs.

(p) Short-term orientation course of 3 days duration may be organised for senior clinicians to acquaint them with design of epidemiological studies.

(q) Certificate course for 3 months in clinical epidemiology may be organised at AIIH&PH and NICD, where well-organised department of epidemiology exists.

(r) Orientation training in Epidemiology of 5 days duration is to be organised at RH&FWTCs for Health Assistants and Block Extension Educators.

(s) Three weeks training for Laboratory Technicians already started at NICD, Delhi and AIIH&PH Calcutta should continue.

(t) Training facilities for entomologists existing at NICD and ICMR Institutions should be fully utilised.

2. MANPOWER DEVELOPMENT FOR EPIDEMIOLOGICAL SERVICES—IN SOUTH EAST ASIA

Dr. N.K. Shah

2.1 Introduction

World Health Organisation collaborates with the member countries in promotion of training in epidemiology. Before elaborating on involvement of W.H.O., SEARO, Delhi, in this respect it would be appropriate to define 'epidemiology' and 'training in epidmiology'.

Epidemiology is 'the study of the distribution and determinants of health and disease in a human populatlon with a view to ensure that health services are planned rationally, disease surveillance is affected and that preventive and control programmes are undertaken and evaluated'.

'Training in epidemiology' is defined as 'Training of personnel at all levels to acquire the necessary knowledge, skills and attitudes to carry out epidemiological activities according to job descriptions'.

Keeping above definitions in mind WHO. establishes guidelines for development of manpower required for epidemiological services. Endeavour of WHO, in this field and its brief review is attempted in the following paragraphs.

2.2 W.H.O's Collabration in Training

Fellowships and Group Training.

WHO, since its inception, has been promoting training in Epidemiology through award of fellowships abroad for nationals and group training, mainly for participation in post-graduate courses and workshops on technical methods connected with development/expansion of national expertise on epidemiology in the countries of the region. WHO also provide support to national institutions involved in epidemiological training, mainly by providing consultancy and cooperating in the development of curriculums and by testing and implementing them. WHO has supported specific national level training activities on epidemiology in India and other countries.

In the early sixties to the late seventies, interregional training programmes in epidemiology, of eighteen weeks duration were supported by WHO. These English-medium courses were first held in either Prague and Delhi

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or in Moscow and Alexandria. Later, these courses were combined into a Moscow-Prague-Alexandria training course and Paris-Bobo-Dloulasso-Abidjan Training course.

Over 100 persons have been trained in these courses. In addition, specialized courses on epidemiology of tuberculosis, leprosy and other communicable diseases were also supported.

WHO has been supporting inservice training courses in the Member countries like : (i) 'Eepidmiology and disease control'-at the National Institute of Communicable Diseases, Delhi (of 3 months duration), and (ii) Diploma in Pulic Health (including epidemiology) at the All-India Institute of Hygiene and Public Health, Calcutta.

2.3 **Intercountry meetings on training in Epidemiology** were held in 1978 and 1981. These meetings emphasised the importance of newer approaches to manpower traning.

The *problems* encountered with epidemiological services and training programmes in the region can be briefly stated as follows :

(I) Lack of trained epidemiologists at all levels of health services as well as in training and research institutions,

(II) Epidemiology not being used to its maximum as a management tool for disease surveillance, control, setting of priorities, or for programme evaluation,

(III) Teaching in epidemiology is too didactic,

(IV) The career structre of Epidemiologists is poor, resulting in a large turn-over of trained personnel, and

(V) Lack of close cooperation between health service organizations and training institutions.

2.4 Field Epidemiology Training Programme (FETP)

There are three basic approaches to teaching epidemiology—short course, academic courses and field oriented training. These three approaches should be seen as complementary to each other and both government agencies and academic institutions, should cooperate in preparing epidemiology training programmes. Recognising that field epidemiologists are a pre-requisite for organized prevention, control and surveillance of communicable and non-communicable diseases, an increasing number of countries in this region showed active interest in the development of service-oriented training in epidemiology.

Being aware of the shortage of epidemiologists, WHO has been committed to promotion of an active training programme in epidemiology in the member States which resulted in the establishment of field epidemiology training programmes.

By applying the known effective principles to the local situations, a two-year in-service field epidemiology training programme was started in Thailand in 1980 in collaboration with CDC, Atlanta, with the objective to train public health physicians in epidemiology. A similar programme was started in Indonesia in 1982. A common factor in the FETPs is the emphasis on actual experience and practical skills in the work of the professional epidemiologists including (i) The surveillance of disease (both infectious and non-infectious), (ii) the investigation and control of public health problems, including outbreaks, and (iii) the planning and field evaluation of public health programmes WHO has been collaborating with this programme by providing expertise and consultation in planning, organization and implementation of training in epidemiology.

FETP is also proposed to be initiated in India and Burma, in the near future. In some countries, consideration may be given to encourage FETP through Technical Cooperation among Developing Countries (TCDC) provisions.

2.5 Deficiencies and needs in the area of training

In the teaching of epidemiology, there is too little linkage between theory and practice. A growing awareness of the importance of in-service training may considerably increase the competence of staff. The need for epidemiological manpower, especially in view of the strategy of 'Health or All by the year 2000' will continue to increase. Epidemiologists will be in demand for the team approach to primary health care. Concerted manpower planning emphasising task-oriented and competency-based teaching is needed to supply adequate manpower. At the same time, the national authorities should remove constraints, leading to better service conditions and career opportunities.

The needs in the area of training in epidemiology can be summed up as follows :

(i) Intensification of all training activities at the country level, that will cover various health personnel directly involved in epidemiology of diseases.

(ii) Giving priority to field-oriented training in epidemiology, regarding it as a short-cut to achieve the best results in most cost-effective manner.

(iii) Promoting close links between field practice and teaching institutions.

(iv) Promoting modern updated, country-tailored teaching methodology for training in epidemiology in favour of the intermediate level epidemiologists ; and

(v) Supporting efforts to apply epidemiological methods in health services and research.

3.7 Future Activities

The future activities in training in epidemiology will include the development of :

(i) training in epidemiological surveillance/service for non-medical personnel at middle and peripheral levels,

(ii) training modules in epidemiology, and

(iii) epidemiological research and utilisation of epidemiological methods for planning and management of health services,

2.8 Conclusion

Indeed, government agencies and academic institutions should co-operate in preparing their programmes, as is being done in Thailand and Indonesia. Long-term inservice training offer the advantage that the major part of the time can be devoted to field work with limited time to scheduled classroom activities. However, the graduates of such programmes will probably benefit from academic courses, covering such topics as 'advanced statistics and research methods' taken at some point in their careers. Field-oriented training should be adapted to meet the needs, resources and health services infrastructure of the country. In all cases, adequate supervision of the epidemiologist-in-training is essential. The trainee should be expected to work productively, not to be a student or observer, and 'consequently should receive a fulltime salary and regular allowances for travel. Whether field-oriented training will succeed in producing adequate numbers of capable epidemiologists, will depend in large part on the quality of the programme and career opportunities for the graduates.

The success of this plan will depend on the understanding and operational will of policy-making national bodies. WHO collaboration in this important field of developing and strengthening of training in epidemiology will continue to be readily available.

3. TRAINING NEEDS IN EPIDEMIOLOGY IN THE LIGHT OF NATIONAL HEALTH POLICY

Dr. P.N. Sehgal

3.1 Intooduction

The Constitution of India envisages the establishment of a new social order based on equality, freedom, justice and dignity of individual. It aims at the elimination of poverty, ignorance and ill health and directs the State to regard the raising of level of nutrition and standard of living of its people and improvement of public health as among its primary duties, securing the health and strength of workers, men and women, specially ensuring that children are given opportunities and facilities to develop in a healthy manner.

Since the inception of the planning process in the country, the successive Five Year Plans have been providing the framework within which the States may develop their health services infrastructure, facilities for medical education, research etc. Similar guidance has been sought to be provided through the discussions and conclusions arrived at in the joint Conferences of the Central Councils of Health and Family Welfare. The National Health Policy has been evolved as a comprehensive approach towards the future development of medical education, research and health services to serve the actual health needs and priorities of the country.

India is committed to attaining the goal of 'Health far All by the Year 2000 A.D.' through the universal provision of comprehensive primary health care services. The attainment of this goal requires an effective system of education and training of medical and health personnel and providing the requisite health services infrastructure. The National Health Policy provides the universal, comprehensive primary health care services relevant to the actual needs and priorities of the community at a cost which people can afford, ensuring that the planning and implementation of the various health programmes is through the organised involvement and participation of the community, adequately utilising the services being rendered by private voluntary organizations active in the heaith sectors. It is necessary to ensure that the pattern of development of Health Services infrastructure takes into account the new 20 point Programme. This programme attributes high priority to the promotion of family planning as a people's

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programme on a voluntary basis, substantial augmentation and provision of primary health care facilities on a universal basis, control of malaria, leprosy, T.B., blindness, guineaworm, EPI, diarrhoeal diseases, maternal and child health services, nutrition programme for pregent women, nursing mothers and children. The programme also places high emphasis on the supply of safe drinking water and improvements in the housing and enivronment especially of the weaker sections of the Society.

3.2 Goals for Health and Family Welfare Programme

The following goals have been laid in the National Health Policy to be achieved by 1990 and 2000 A.D.

Sl. No.	Indicator		Goals 1985	1990	2000
1.	Infant mortality rate	Rural	122		
		Urban	60		
		Total	106	87	below 60
	Perinatal mortality		67 (1976)		30-35
2.	Crude death rate		12	10.4	9.0
3.	Pre-School child (1-5 yrs) mortality		20-24	15-20	10
4.	Maternal mortality rate		3-4	2-3	below 2
5.	Life expectancy at birth (years.)	Male	55.1	57.6	64
		Female	54.3	57.1	64
6.	Babies with birth weight below 2500 grms (percentage)		25	18	10
7.	Crude birth rate		31	27.0	21.0
8.	Effective couple protection (percentage)		37.0	42.0	60.0
9.	Net Reproduction Rate (NRR)		1.34	1.17	1.00
10.	Growth rate (annual)		1,90	1.66	1.20
11.	Family Size		3.8		2.3
12.	Pregnant mothers receiving ante-natal care (%)		50-60	60-75	100
13.	Deliveries by trained birth attendants (%)		50	80	100

1	2	3	4	5
14.	Immunization status (% coverage) (1982)			
	TT (for pregnant women)	60	100	100
	TT (for school children)			
	10 years	40	100	100
	16 years	60	100	100
	DPT (children below 3 yrs)	70	85	85
	Polio (infants)	50	70	85
	BCG (infants)	70	80	85
	DT (new school entrants) 5-6 years)	80	85	85
	Typhoid (new school entrants 5-6 years)	70	85	85
15.	Leprosy—percentage of disease arrested cases out of those detected.	40	60	80
16.	TB—percentage of disease arrested cases out of those detected.	60	65	90
17.	Blindness—incidence of (percent)	1	0.7	0.3

Source—National Health Policy, Ministry of Health and Family Welfare, Govt. of India, New Delhi,

3.3 Administrative structure and Programme Delivery System

India is a Union of States. It comprises of 22 States and 9 Union Territories. All Public Health and Family Welfare Programmes are managed by the State/Union Territory administrations. For administrative convenience, States/Union Territories are further divided into 412 districts with an average population size of about 1.5 million. District is the operational Unit for planning and implementation of development programmes including programmes of Public Health and Family Welfare. The Chief Medical Officer (CMO) heads the Health and Family Welfare services in the district. A primary Health Centre (PHC) headed by a qualified medical doctor for 30,000 population (20,000 population in a hilly and tribal area) and community health centre (CHC)/upgraded PHC for a population of about 100,000 have been/are being established. CHC will function as a referral centre with specialised services in medicine, surgery, paediatrics, gynaecology and public health. In urban areas, Family Welfare Centres have been established in slums and congested urban localities and these are linked with urban hospitals and/or post-partum centres which are specialised centres for mother and child care services and are attached to medical colleges,

district hospitals and other large hospitals. There is a sub-centre for every 5,000 population in rural areas and for 3,000 population in hilly and tribal areas manned by a trained female and male health workers.

The primary health care chain has now been extended to the village level, where a community health worker called. Village Health Guide (VHG) has been appointed to work as a link between the community and the functionaries of parimary health care. About 3,50,000 trained-village health guides are already in position against a total number of about 5,76,000 VHGs. A trained birth attendant (Dai) is yet another community worker who provides mid-wifery services. 5,00,000 Dais have been trained so far and the scheme will be continued in the 1985-90 Plan.

Female multipurpose workers (trained auxillary nurse midwife) plays a key role in child and maternal health programmes partciulary in respect of immunization. Training and upgradation of the scales of these female workers will be crucial to the success of the primary health care. The work of female worker is supervised by a lady health visitor (LHV) or female multipurpose supervisor. One LHV supervises the work of four female workers. Male multipurpose workers and supervisors are also similarly associated with the primary health care delivery system. The present situation and future plans for expansion of the primary health care delivery network is given below :

Health and Family Welfare Delivery Network

Facility	*Required according to scale*	*Numbers Likely in position 1.4.85*	*7th Five Year Plan Proposal 1990*
C.H.C.	5417	590	1710
P.H.Cs	21666	*11416	21666
Family Welfare Centres	5851	5428	5851
Sub-Centres	1,30,000	80,000	1,30,000
Post-Partum Centres	2450	614	1350
Urban F.W. Centres	Scheme under review	2583	Scheme under review

*Including SHC.

Besides the extensive infrastructure of public health services the following are the number of physicians available in the country in the various systems of medicine.

Trained Health Personnel

Physicians	*Number*	*Percent*
Allophaths	268,712	40.59
Ayurvedic	233,629	35.28
Homoeopaths	112,638	17.00
Unani	28,737	4.34
Siddha	18,157	2.77
Total	661,873	100

In India, where the proporation of physi cians to the population is small, nearly all available physicians and other health workers have to be called upon to play multipurpose roles, with responsibility for the total health care of large populations. Therefore all of them need to be trained in epidemiology either in the under graduate or in in-service tra ning programmes.

3.4 Job/Training Requirements

For providing effective primary health care and implementation of the various national health programmes, it is essent al that the health functionaries at various levels need to be given su.table tra'ning so as they achieve the necessary knowledge and skill for their jobs. The development of functional epidemiological serv ices at rural level as an integral part of general health service is of urgent need. The job/training requirements for various levels are mentioned below :

Manpower at different tiers of Health Services	**Job/Training requirement**
Peripheral level :	
Community Health Worker (Voluntary)	Recognition and reporting of the occurrence of a certain important diseases, Reporting vital events, Emergency medication / immediate treatment.
Basic Healh Workers, field supervisory worker	Screening and verification of reports, Knowledge of the epidemiology of important diseases, Collection of sample, Containment measures.

Medical Officers of health at the most peripheral level (PHC)	General public health practice with components of training in epidemiology geared to serve the needs of national priority problems, including the need to train the auxiliaries at the peripheral level.
Intermediate level (District)	
(a) Health Administrator (training through short courses)	Required to provide administrative support. Support for epidemiological activities in their area.
(b) Professional epidemiologist (fully trained)	Conduct epidemiological activities in his area consisting of a population between 1-2 million.
State level	Provide necessary service, guidance and assistance in planning, programming and organising epidemiological services through out the State and organising the necessary training and research. Responding to the needs of different tier of health services in the State through epidemiological terms consisting of specialists.
Training requirements :	
Auxiliary-level worker	Auxiliary-level workers who have already received some training would need some additional training in epidemiology. For the fresh recruit the curriculum is to be modified incorporating necessary contents on epidemiology relevant to his job requirement in the standard manual.
Doctors and others concerned with the discipline	There should be short and specialized courses on epidemiology (2-3 weeks) for the inservice training of doctors and others concerned in the discipline.

Professional epidemiologist	Two years' academic and practical course to be provided for the training of professional epidemiologists (training needs to be followed by periodic refresher courses).
Laboratory services (as an integral part of epidemiological units at intermediate/peripheral level with referral service facilities at the central or other level for complex tests)	Provide necessary support in the confirmation of diagnosis and disease investigations. Detection of cases including other supporting services.

References

1. National Health Policy, Govt. of India, Ministry of Health & Family Welfare, New Delhi (1983).
2. Report of the meeting on Planning of Regional Training in Epidemiology—1978, WHO, SEARO Delhi.

4. REVIEW OF EPIDEMIOLOGICAL SERVICES AND TRAINING IN INDIA

Dr. Mahender Dutta

4.1 Introduction

Epidemiological services in India developed as an integral part of programmes for prevention and control of communicable diseases that were implemented in post independence era. Bulk of the morbidity and mortality was due to preventable communicable diseases such as malaria, smallpox, cholera, plague, tuberculosis, leprosy, filariasis and others. Therefore, national control/eradication programmes against these diseases, emphasising epidemiological surveillance as their integral part were formulated and successfully implemented through the successive national five year development plans.

The Republic of India comprises of 22 states and 9 union territories. In the Indian constitution 'Health' is listed as a state subject though the central government has the responsibility inter-alia of controlling the inter-state spread of disease as well as of laying down the standards of medical education and imparting post-graduate medical education. A high-level committee of experts in 1947 recommended to the Government of India the setting up of 'regional organisations' representing the central and state governments in the region and induct experts, in order to promote collaboration and co-operation for urgent action in regard to the control of inter-state spread of communicable diseases. Another expert committee in 1961 recommended the establishment of well-equipped units with adequate mobiltiy in each state and central health department for undertaking epidemic investigation, study of disease endemicity and survey of morbidity.

In order to establish effective epidemiological services, training in epidemiology of physicians and other health personnel at different levels of health administration is being undertaken by the All India Institute of Hygiene and Public Health (AIIH&PH), Calcutta and the National Institute of Communicable Diseases (NICD), Delhi ; At both these institutions separate epidemiology sections have been functioning since their inception in 1938 and 1963 respectively. The AIIH&PH Calcutta which has ten departments (public Health administration, epidemiology, microbiology, statistics, nutrition, industrial hygiene, maternal and child health, sanitary

*Deputy Director General (Planning), Director General of Health Services, Govt. of India, Ministry of Health & F.W.

engineering, health education and social medicine) and rural and an urban practice field areas, have been providing training in epidemiology to the medical and other health professionals attending post-graduate diploma and degree courses in specialities of prevention and promotion of health. The NICD Delhi which has seven divisions (Epidemiology and Statistics, Microbiology, Malariology Zoonosis, Helminthology, Medical Entomology and Biochemistry) and several field units has been imparting orientation training in epidemiology since 1964 to medical officers working in the state and central health departments and has also collaborated with the World Health Organization in the 'Inter-Regional Training Course in Epidemiological Surveillance and Control of Communicable Diseases' during 1976-77 and 1977-78.

4.2 Status of Epidemiological Services

A number of trained experienced epidemiologists, well-equipped public health laboratories and other support facilities are existing at a number of research institutions in communicable diseases in the country under the central and state government ; a few of these have international recongition which include (i) the National Institute of Communicable Diseases, Delhi, (ii) the National Institute of Tuberculosis, Bangalore, (iii) The National Institute of Cholera and Enteric Diseases Calcutta, (iv) The National Institute of Virology, Pune, (v) the Central Leprosy Training and Research Institute, Chingleput, (vi) the Haffkine Research Institute, Bombay, (vii) the Malaria Research Centre, Delhi, (viii) the School of Tropical Medicine, Calcutta, (ix) the ICMR Entero-virus Research Centre, Bombay, (x) the National Environmental Engineering Research Institute, Nagpur, (xi) the Institute of Venereology, Madras.

Several post-graduate schools of public health and veterinary sciences have full-fledged epidemiology departments ; these include the All India Institute of Hygiene and Public Health, Calcutta, the National Institute of Health and Family Welfare, New Delhi and the Indian Veterinary Research Institute, Izatnagar.

A number of epidemiologists are also functioning in the central and state health departments either in the capacity of health service planning and administration, epidemic intelligence and control and as epidemiologist or officers-in-charge of national disease control/eradication programmes. Several of the states namely Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu and others have established full-fledged epidemiology bureaus/units. Mobile units/teams for field investigations and containment of epidemic also exist in a few states. In almost every state, a referral health laboratory at state level has been established besides the research labora-

tories existing in several states. Health statistical/inielligence units or cells for collection, analysis and dissemination of data exist in many of the state health departments as well as the national level.

In almost all the 108 medical colleges, one of the senior faculty staff of the departments of Social and preventive medicine is stipulated to be trained in epidemiology (though the position is mostly held by a M.D. in Social and Preventive Medicine) and well-equipped health laboratories exist in the department of microbiology.

At the district level, the Chief Medical Officer is assisted by a Deputy Chief Medical Officer (Public Health) and a District Health Laboratory. There is also a district epidemiologist in a few states. The National malaria eradication and other disease control/eradication programmes for communicable diseases of major health importance which were initially developed as vertical programmes, have mostly become an integral part of the general health services at district and peripheral levels. Majority of these medical officers functioning as epidemiologists, however, have received academic training in public health like diploma in public health or master degree in public health from US or sometimes orientation training in public health at National Institute of Health and Family Welfare (or in epidemiology at the NICD Delhi).

Therefore, at present trained epidemiologists are mostly working in the following positions :

(i) in central (and regional) and state/union territory health departments mostly in the health/epidemiological bureau/cells and sometimes in health planning units ;

(ii) in national disease control/eradication programmes at national and state/union territory headquarter levels and in a few large states at divisional/zonal levels ;

(iii) in the depertments of preventive and social medicine (or community medicine) of each medicla schools ;

(iv) in the schools of public health and in some of the post-graduate veterinary sciences training institutes ; and

(v) in several of the research and training institutes on communicable diseases.

4.3 Acidemic Training in Epidemiology

A number of medical officers were deputed abroad during the decades 1950's and 1960's for receiving academic training in epidemiology either in USA or in Europe under WHO funded projects. At present, the following academic training programmes are organised within the country :

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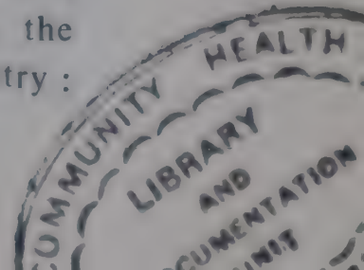

• Ph.D in Epidemiology at AIIH & PH Calcutta. The Course is open to holders of M.D. (Social and Preventive Medicine). After completion of selected research project a thesis is submitted to the University ; following its acceptance an oral examination is held to determine the eligibility of award. There is no formal training in this course. Only occasional candidates are registered for the programme.

• Diploma in Epidemiology at AIIH & PH Calcutta for post graduates in medicene. One course was conducted in 1981 for four candidates sponsored by the Indian Council of Medical Research, who were holding M.D. in Medicine. The duration was of one year. For initial three months the trainees were placed at the AIIH & PH Calcutta for gaining knowledge about epidemiological principles and field work ; next five months comprised of field work at Tuberculosis Research Centre, Madras (two months), Medical College, Aurangabad (two months) and Regional Occupational Health Centre, Bangalore (one month) ; in the following month discussions on field experiences followed by mid-term assessment at the AIIH & PH Calcutta. Finally, the trainees were assigned for two and a half months to a medical college on a research project and on return to the Institute, the project reports were presented by them before the terminal evaluation at the AIIH & PH Calcutta.

• Membership National Academy of Medical Sciences (MNAMS) & M.D. in Social and Preventive Medicine/Community Medicine/Health Administration.

• MD. in community Health Administration at the National Institute of Health and Family Welfare, Delhi.

Nearly one hundred such postgraduates qualify every year from selected medical colleges and a few medical research institutes. The curriculum of these post-graduate courses are of duration of two to three years and includes general principle of epidemiology, statistical approach to investigations and surveys, special epidemiology of selected communicable and non communicable diseases, epidemiological and statistical methods, national health programmes and planning and evaluation of health services. The methodology of training incorporates seminars, group discussions, problem-solving exercises and some field work. One of the six terminal examination paper is in epidemiology.

• Diploma in Public Health (DPH)

This course of one academic year is imparted at 12 medical institutions /colleges including AIIH & PH Calcutta. About 125 trainees are admitted annually. About 140 hours (almost 13% of total) time is allocated for teaching in epidemiology. Epidemiological methods (descriptive, analytic and experimental), transmission dynamics of communicable diseases and

their surveillance and control, and outbreak investigation are emphasised. Besides the class-room training which includes problem-solving exercises. Field training is also imparted in rural and urban field practice areas.

- Master in Veterinary Public Health (MVPH) at AIIH &PH Calcutta.

The course is of two years duration, organised in collaboration with the Indian Veterinary Research Institute, Izatnagar (UP) and open to veterinary science graduates. About 14 hours training in epidemiology is included on similar pattern as in DPH. course.

- **Undergraduate (MBBS)**

About 108 Medical colleges with annual in take of about 13,000 train medical graduates. Social and preventive medicine is one of the subjects in the undergraduate medical course. One of the senior faculty members of the department is stipulated to be a trained epidemiologist. General principles of epidemiology, fundamentals of biostatistics, communicable diseases and their prevention and control (descriptive epidemiology), introduction to analytical epidemiology and the national disease control/eradication programmes are covered under the curriculum of social and preventive medicine. The training at present is mostly didactic ; there is hardly any exposure to field training or even the paoblem-solving exercises, though three out of twelve months of internship period is in rural practice field area under department of social and preventive medicine.

4.4 Inservice training programme in epidemiology

(a) National Course in Epidemiology and Control of Communicable Diseases at NICD Delhi

The aim is to provide training to senior public health officers to enhance their competence to promote national epidemiological surveillance system, disease control/eradication programmes and epidemiological surveys. Earlier this course was of 72 working days (about three months) duration and being held once a year since 1964. In each course about 15 participants, mostly intermediate or higher level medical officers often with post-graduate diploma or degree in public health or social and preventive medicine and possessing field or teaching experience were trained. The emphasis was on practical work, problem-solving and field exercises. The cirriculum covers the epidemiological principles, methods and tools, biostatistical methods, collection and despatch of materials for laboratory examination and the interpretation of results including entomological practice, principles of serology and immunology, outbreak investigation, natural history, surveillance, prevention and control of selected diseases of

health importance and management of disease control programme. Considering the difficulties of sponsoring authorties and to attract more participants a 21 days course was started w.e.f. 1984.

(b) Ad-hoc course in epidemiology organized at AIIH & PH Calcutta

The Institute has been conductidg a summer course in epidemiology for techears of social and preventive medicine as well as a training course for health administrators of about 3/4 weeks duration.

(c) Other ad-hoc workshops/courses

Workshops and orientation courses of short duration have been organised to meet the needs of national disease control/eradication programmes for the medical and other health personnel of specific diseases at NICD Delhi, AIIH & PH Calcutta and other ICMR/national/state Institutes.

4.5 Field-oriented training programme in epidemiology

There is no specific field-oriented training programme for professional epidemiologists in the country. However, as already mentioned, the academic training courses of medical officers in diploma in epidemiology and diploma in public health incorporates field training in rural as well as in urban field practice areas. Moreover, the orientation training programme conducted at NICD Delhi incorporates about two to three (out of 12) weeks field training experience.

4.6 Needs and demands of epidemiological services

Epidemiological services at present are mostly used for promotion of disease surveillance and control activities, and to a limited extent, for planning,administration hnd evaluation of health services. At the national regional, state, zonal and district levels of health administration, the epidemiological services are required to be effectively provided through professional epidemiologists. Morever, epidemiological services are also to be provided for active surveillance of specific diseases covered under the national control/eradication programmes for malaria, filariasis, tuberculosis leprosy, diarrhoeal diseases, childhood infections (preventable through immunization), and sexually transmitted diseases.

Epidemiological research-design and conduct of epidemiological, studies to determine practical, efficient and economic methods of diseases prevention and control, have to be undertaken by the institutes for commun cable diseases research where services of professional epidemiologists should be provided for the purpose.

Man-power development for epidemiological services as well as for epidemiological research should also be effectively organised through strengthening of the post-graduate public health/veterinary training and research Institutes in which full-fledged departments of epidemiology is required to be established.

All physicians and other health personnel responsible for organised disease surveillance at the peripheral levels of health services need to be trained in collecting epidemiological data, to interpret it and to apply the findings for improving surveillance and control. Therefore, the training of undergraduate physicians and other health professionals as well as para-medical personnel needs adquate strengthening in epidemiology. In all medical colleges one of the faculty staff is stipulated to be an epidemiologist. In the state health and family welfare training centres that conduct orientation training of health centre physicians and other personnel as well as in the institutions of training of male and female health supervisors and workers, a senior medical officer of the faculty should be an epidemiologist or at least adequately oriented in epidemiology so that the trainees could develop the needed skills and knowledge.

4.6.1 Professional epidemiologist

Based on the above needs, the following demand for professional epidemiologists has been estimated for the country :

I For epidemiological services :

(a) at national and regional levels (central health directorate and 17 regional health offices of the Ministry).

(b) 22 state and a union territory health departments and the zonal organisation in large states.

Epidemiologists are required in the above organisations for the following functions :—

(i) national disease control/eradication programmes

(ii) Surveillance of epidemic prone diseases

(iii) planning, administration and evaluation of health services and for studying impact.

(c) district level (in 400 districts) :—

An epidemiologist is provided under NMEP but his training at present is disease specific.

(II) For epidemiological research :

Several epidemiologists are needed for the epidemiology departments in each of about 25 institutes of the communicable disease research.

III For training in epidemiology :

(i) For 20 post-graduates schools of public health and veterinary sciences

(ii) in departments of social and preventive medicine of 108 medical colleges.

(iii) in the 46 health and family welfare training centres.

However, some of the above requirements can wait till the others are met, e.g. the district level epidemiologists could at present be imparted job-oriented practical training. Similarly, epidemiologists in medical colleges could be involved in the community-oriented epidemiological services such as outbreak investigation and epidemiological surveys so as to provide a practical approach in the training imparted by them. Also the senior medical officers in rural health and family welfare centres can be for the present be provided short orientation training in epidemiology till a whole-time epidemiologist is provided.

4.7 Achievement and constraints of epidemiological services

There have been several major achievements in the development of epidemiological services in the country :

- Growing realization by senior health administrators of need of extension of epidemiological services and knowledge of epidemiology in all health work ;
- Increasing utilization of epidemiological expertise for outbreak investigation, disease surveillance, identification and solution of health problems as well as the evaluation of programmes ;
- Development of excellent epidemiological expertise at several central and state research institutes ;
- Several national diseases control/eradication programmes are effectively utilising epidemiological expertise (built in the programme) for better surveillance and control ;
- Establishment of organised bureaus/units of epidemiology at several state headquarters ;
- Building-up of epidemiological services as an integral part of the general health services being increasingly recognised by the national and state health administrations ;
- Awareness of need for strengthening of manpower development programmes to produce professional epidemiologists, such as in NICD Delhi and AIIH & PH Calcutta ;

- Growing emphasis on epidemiological research operational value and consequent strengthening of communicable diseases research institutes :
- Fortification of basic training porgramme of medical and other health personnel in epidemiology ;
- Awareness of orientation training in epidemiology for senior health administrators responsible for planning administration and evaluation of health services ;
- Strengthening of orientation training of health centre physicians and other personnel in epidemiology by problem-solving methods.

Inspite of the above mentioned positive factors, there are several constraints in the development of epidemiological services :

- Inadequate recognition for public health and epidemiology as a discipline leading to lack of attraction of medical graduate for taking it up a career-path ;
- Health services being curative oriented, indequate authority vests with the epidemiologists at state and central levels ;
- Promotion to higher levels being based on seniority rather than job requirements ;
- Due to indequate orientation of policy making and decision taking authorities, their inadquate appreciation and utilisation of epidemiological information frustrates the epidemiologists ;
- Inadequate employment opportunities for epidemiologists in health service and the under utilization of existing epidemiologists who are mostly used for epidemiological teaching rather than development of services ;
- Training in epidemiology and under-graduate medical and other health professionals as well as para-medical personnel provide inadequate practical community-oriented experience, and therefore these health personnel are not sufficiently motivated to use the epidemiological methods in their functioning ;
- Inadequate co-ordination between institutes training in epidemiology and epidemiological services. Training is to be built around epidemiological service and involve training centres in services ;

Lack of co-ordination of resources of epidemiological experts in the absence of a well-knit organised epidemiological service at state and central levels.

4.8 Future plan activities for epidemiological services/training and utilization of epidemiologists

A national workshop on epidemiology that was convened by the Director General of Health Services in 1979, was attanded by representatives of many state health departments including medical colleges and the research institutes for communicable diseases. The following recommendations were made :

4.8.1 Epidemiological services :

(i) A 3-tier epidemiological service at the local intermediate or district and state/central levels should be organised in the country as an integral part of health services ;

(ii) For effective coordination of various discipline and organizations involved in the epidemiological surveillance, senior-most level officers directly responsible to the Director/Director General of Health Services should function as the Director of Epidemiological services at the state/central levels ;

(iii) For the organization of epidemiological surveillance a headquarter Epidemiological Unit with a team of epidemiologists should be established in every state health department and the Directorate General of Health Services ; this unit should have epidemiological surveillance teams with necessary facilities to assist the districts ;

(iv) Every national diseases control programme should be strengthened with epidemiological expertise for planning and evaluation as well as training needs either through incorporation of adequate inbuilt epidemiological expertise or through the integration of a research and training centre side-by-side with the programme both at the state as well as central level on the same pattern as being followed in the case of NMEP at the National level. If necessary epidemiological divisions should be established in the selected research and training institutes to provide such effective collaboration.

(v) To strengthen the epidemiological surveillance progremmes well-equipped public health laboratory services, particularly at primary health centre, district, regional and state levels should from an integral part of the epidemiological services.

4.8.2 Training in Epidemiology :

(i) Training programmes for each category of health and medical workers should be reviewed and the amount and kind of training

in epidemiology that need to be imparted should be specified for every category ;

(ii) Teaching of epidemiology in undergraduate medical courses in preventive medicine shold be strengthened through emphasis on practical field training in collabroation with the community health services ;

(iii) All the medical officers-in-charge of primary health centres and municipal medical officers of health without postgraduate qualifications in public health should received orientation training in epidemiological and public health with the assistance of medical college faculties to enable them discharge their duties effectively ;

(iv) Existing health workers who assist in disease control activities should receive orientation training of reasonable duration at selected centres for training ;

(v) All health and medical administrators working at the district and higher levels should undergo training in epidemiology and those officers who are actively engaged in the communicable diseases control activities should undergo extended training at National centre ;

(vi) Training courses for professional epidemiologists should be organised both at the NICD, Delhi and at the AIIH & PH Calcutta and the training programme being followed at present should be augmented by providing further practical field training ; if necessary by extending the duration of training.

Considering the constraints of available facilities, it was recommended that the department of preventive and social medicine in the medical college could assist the health services on a zonal basis in a group of districts for providing epidemiological services ; it would facilitate practical traning of medical undergraduates. Morever, the medical colleges could be also used for assisting in the orientation training of medical officers up to the level of districts.

4.9 Recommendations for improvement in Epidemiological training and services, including intermediate and peripheral levels

(i) To effectively demonstrate the valve of epidemiologic expertise, the Ministry of Health and Family Welfare may take the initiative to train a group of medical graduates in epidemiological techniques and employ them for services at its regional health offices under

the technical control of the NICD Delhi. The trained epidemiologist would be seconded to the state health departments for assisting them in epidemiological functions and the needed local suoport of statistical and field investigators will be provided by the state health authorities. However, the success of the scheme will be more dependant upon the type of training that will be imparted to these medical officers. The NICD Delhi and the AIIH & PH Calcutta should jointly conduct practical community-oriented field training programme for these officers. The successful implementation of the central epidemiological service on the above pattern will stimulate the development of state epidemiological services on a similar pattern and also promote the use of epidemiological expertise for a variety of health functions.

(ii) Academic training imparted at the AIIH & PH Calcutta may continue with modifications to incorporate more practical field training and problem-solving exercises and such trained medical officers could be utilised for research and training institutions including medical colleges.

(iii) The orientation training orogramme in eoidemiology couducted at the NICD Delhi should also be further strengthened by incorporating additional practical field training and the training facilitiy should be augmented so as to hold two courses in each year. Moreover, the AIIH & PH Calcutta should also hold similar additional orientation courses to begin with once a year.

(iv) Another step to promote effective utilization of epidemiological expertise would be to enhance the authority of the state and national level epidemiologists by making them directly responsible to the Director or Director General of Health Services respectively and to provide a focal point of co-ordination for the state and national level epidemiological resources in the state and central health departments by establishing state and central epidemic advisory boards.

REFERENCES

1. Dutta. Mahendra, Chakraborty, A.K. & Sehgal P.N. (1978). Brief review of training in epidemiology in India and future needs of the country ; an unpublished paper presented at Meeting on Planning of Regional Training in Epidemiology, SEARO, New Delhi 25-27 September 1978.

2. Kostrzewski, J (1978), Training in epidemiology in the countries of South East Asia Region ; Working paper, WHO, SEARO.

3. Report of National Workshop on Epidemiology NICD Delhi, 29 October-2 November, 1979, Directorate General of Health Services, Govt. of India, New Delhi.

4. Dutta, Mahendra and Bhasin, V.P. (1979). Epidemiological intelligence system in India, Central Bureau of Health Intelligence, Directorate General of Health Services. Ministry of Health & Family Welfare, New Delhi.

5. Prospects 1980-81, All India Institute of Hygiene and Public Health, Calcutta.

6. Sengupta, S.K. (1979) ; Organization of Epidemiological Surveillance ; an unpublished paper presented at the National Workshop on Epidemiology NICD 1979.

5. EPIDEMIOLOGICAL MANPOWER AND TRAINING IN INDIA

Dr. Jai P. Narain and Dr. R.S. Sharma**

Epidemiology is a fundamental science, the knowledge of which has a direct bearing on our understanding of the natural history of the disease, transmission dynamics as well as the formulation of control strategies against various health problems. It has made major contributions to medical science and is a central discipline on which is based the practice of all the public health activities. It is therefore expected that due emphasis may be placed on training in epidemiology in the country. Unfortunately, such a training in most medical college both at under and postgraduate level is unsatisfactory which has thus partly contributed to to the critical lack in epidemiological manpower in the country. With the mounting pressure on the existing health services due to the changing socio cultural and environmental factors and emergence of health problems which did not exist before the need for increasing epidemiological support in terms of trained manpower can not be over emphasised. This calls for a review of existing epidemiology training in the country and making necessary recommendations to augment the same in the light of changing situation.

5.1 Existing Training Courses :

There are at least 114 medical colleges in the country where opportunities exist for providing epidemiology training. However, the epidemiology training during undergraduate level is generally limited to classroom teaching of descriptive epidemiology with special reference to communicable diseases, fundamentals of biostatics, introduction to analytical and experimental epidemiology and 3 months internship training at field practice level. During the postgraduate level, epidemiology is taught as a part of MD Preventive and Social Medicine which is a 3-year residency pragramme. Following observations/suggestions can be made regarding epidemiology training in most medical colleges. The course content under the subject of Preventive and Social Medicine is too broad and covers apart from epidemiology, social medicine environmental health, bio-statistics, maternal and child health, family planning, occupational health, health administration and management and history of medicine. As a result fewer hours are devoted

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for teaching of epidemiology There is inadequate staff in the PSM departmen o most of the medical colleges. In addition, epidemiology in general is taught by those who neither have had formal training nor adequate experience in epidemiology. In order to have an effective training an appropriate staff/faculty is necessary. It would not be an unwise therefore to have under the preventive and social medicine department in each medical college a post of Professor or an Associate Professor of Epidemiology who will be responsible for teaching of epidemiological concepts and methods to both under and pos graduate students. Few of the Medical Colleges like Medical College Lucknow, B.H.U., Varanasi, Osmania Medical College Hydrabad have already implemented the programme. At present, Epidemiology training is almost entirely of theoratical nature with litt e or no field component. For proper development of epidemiological expertise, the training must place adequate emphasis on field training especially at pos graduate level. Various departments engage in teaching of a particular subject with little or no collaboration with colleagues from other departments. Such an isolated teaching does not help students in proper understanding of various inter-relationships in a disease process An integrated teaching on the other hand would be more useful as it would include discussion on the magnitude of the disease as a public health problem, it's pathophysiology, clinical features and diagnosis, treatment as well as strategies of prevention and control.

Besides teaching of epidemiological concepts, the course curriculum should also include application of these concepts in various health fields i.e. health planning, primary health care, disease surveillance etc. Under the Reorientation of Medical Education (ROME) Scheme, each of the medical colleges has been entrusted, with 3 primary health centres. These primary health centre areas could serve as rural field practice areas which could be used for data collection, analysis and interpretation. In addition, the postgraduate students should involve themselves in various health programmes going on in these primary health centre areas. Such an exposure would bring out not only the relevance of epidemiology in various health fields but also demonstrate it's value and use in day-to day activities.

Students should also be oriented towards importance of epidemiological concepts in clinical setting. In fact, in clinical medicine, it is as fundamental as disciplines of microbiology and pharmacology. For example, in the practice of clinical medicine, epidemiology provides rational basis for making diagnostic and therapeutic decisions. In health planning and resource management, epidemiological skills can be used to establish priorities and facilitate decision making process. At undergraduate level, training should

also prepare students to appreciate cause and effect relationships in disease process while to postgraduate students it should in addition impart basic skills in research design and analysis.

Last but not the least, the discipline of Preventive and Social Medicine or public health as a whole has a rather low standing in the medical profession. For this reason, most students after completing their undergraduate training do not opt for a career in public health. The few who attain postgraduate degree in the subject are not able to receive further indepth training in epidemiology because virtually none of the universities offer a degree in epidemiology. Not unexpectedly therefore concerns are now expressed relating to the quantity and quality of epidemiological manpower in general and epidemiologists in particular in the country. This particular problem is the direct result of the lack of policies, of well defined career structure and opportunities for trainined epidemiologists. Unless a clear career structure for epidemiologists is identified, this problem is likely to continue.

5.2 Other postgraduate courses :

Other post-graduate degree course offerings where epidemiology is taught include Diploma in Public Health (DPH) and Masters in Veterinary Public Health (MVPH) in about 40 national institutions, and MD in Health Administration from National Institute of Health and Family Welfare. Delhi. Ph.D. and D.Sc., post doctoral degree in epidemiology can be obtained from few institutions. The National Board of Examinations which has earlier been offering Membership of National Academy of Medical Sciences (MNAMS) in Epidemiology has unfortunately stopped doing so.

5.3 Inservice Training

In-service epidemiology training courses for medical officers at district level are currently being conducted in three institutions the National Institute of Communicable Diseases, Delhi, All India Institute of Hygiene and Public Health, Calcutta and Rural Institute of Health, Gandhigram. These courses are of 3 week duration which provide opportunities for training in basic epidemiological and biostatistical methods, field training and orientation on current national health programmes. Methods used in teaching apart from lecture discussions include problem solving exercises, modules, film shows as well as conduct, analysis and interpretation of survey in the field. The training is more of practical nature and provides adequate exposure on practical problems like epidemiological surveillance, epidemic investigation, survey methodology etc. NICD has already conducted 5 such courses while AIH & PH and Gandhigram institute have

conducted one course each. These courses have been attended part from District and State level Officers, also by medical college faculty and medical officers of Municipal Corporation.

Ad-hoc in ervice courses in the field of epidemiology with special referance to specific diseases like tuberculosis, leprosy, malaria, filaria, cholera etc. are conducted at NICD branches, NTI Bangalore, Central Leprosy Training and Research Institute, AIIH&PH and ICMR branches like National Institute of Cholera and Enteric Diseases, Calcutta etc.

5.4 Training and Manpower Requirements :

The prevalent situation concerning the epidemiology training is in part resposible for the existing epidemiological services in the country which unfortunately is fragmentary, institution oriented, least documented and lacking ability to provide necessary guidance both in terms of current status of health problems as well as in formulating of appropriate strategies. For example, hardly a few of the medical college in the country, postgraduate institutes and research centres including several national and international level research and referance laboratories, the programme directorates are able to give a valid and authentic nationally applicable data on health problems based on proper epidemiological surveillance. Involvement of a l these existing institutions in the survei lance activities and augmenting them wherever necessary would otherwise have helped a great deal in our pursuit for the Health for all by 2000 AD goal. There are diseases like tuberculosis, malaria, filaria. diarrhoeal disease, endemic goitre, for which we have sufficiently devolped national programmes. Besides these diseases, there is also a need to evolve a national strategy for epidemiological surveillance which will include also other important diseases which are not under the national programmes. Such system will ensure the uniformity of data collection, analysis, interpretation and dissemination, leading to a planned health services. It may also assist in epidemic forecasting.

To achieve these objectives, the services of about 700 professional epidemiologists at the State/Zonal/District level, at medical colleges, research institutions and laboratories will be needed. Each district needs the services of one qualified epidemiologist and there are about 400 districts in India. Another 215 epidemiologists will be needed at the State head-quarters (31), in zones and divisions in States (50), medical colleges (114) and various research institutions (20). These professional epidemiologistis will have to be trained. Therefore, academic teaching and inservice training facilities have to be organised to meet the national requirements of specialist epidemiologists.

Training Needs—WHO workshop on the teaching of epidemiology held at Manila, during 23rd October-3rd November, 1980 recomended that (i) workshop at national level should be organised to develop training pro-

grammes according to the specific needs of each country : (ii) that WHO should coordinate the resources available and exchange of expertise between different countries ; (iv) that the respective government should create structured posts similar to those for clinicians to encourage the talents to take up the career in epidemiology. Thailand Government, Ministry of Public Health started field epidemiology training programme in May, 1980. The training is primarily field oriented on local problems and the duration is for 2 years. Nineteen epidemiologists have been trained or are being trained till 1982. Review of this training programme showed encouraging results. Similar field epidemiology training programmes have now been started by Indonesia, Taiwan, Saudi Arabia and Mexico. It is contemplated to start a similar programme in India in the near future with USAID/WHO collaboration. NICD will be the pivotal institute in conducting this training programme.

5.6 Suggestions

Keeping in view national requirements of epidemiological services, there is need to have the following academic and inservice training in epidemiology ;

(a) There is a need to start a course leading to the award of M.D. in epidemiology under universities with academic session for 2/3 years in postgraduate institutions and medical colleges.

(b) The National Board of Examinations should be pursuaded to revive Diplomate NB (epidemiology) because of it's importance and relevance for national health service devalopment. Institutions like NICD. AIIH & PH, National Institute of Health and Family Welfare, ICMR institutes, etc. may start a programme of fellowship leading to Diplomate NB (Epidemiology). The enrolled candidate will undergo epidemiology course at NICD. He will have a research project on epidemiological problems and simultaneously he can prepare for the Diplomate. All these academic courses should have sufficent field training component.

(c) In medical colleges, there should be posts of the rank of Professor/ Associate Professor of epidemiology to head the epidemiology division of the Preventive and Social Medicine department. The teaching of epidemiology in M.B.B.S. and MD courses may have to be reoriented, keeping in view the needs of our national requirements.

(d) For in-service training of health professionals following suggestions can be made :

(i) Existing epidemiology course at 3 institutions i.e. NICD, AIIH & PH and Gandhigram may be continued. This may be further extended to other institutions in the country. More institutions may be identified for the purpose.

(ii) Medical colleges and NICD branches may start short courses for medical officers of PHC.

(iii) Short orientation training of 2 weeks for paramedical may be started at district level in collaboration with medical colleges/ NICD branches, Regional Health & Family Welfare Training Centres.

(iv) Village level workers should be trained at the PHC level so that they are able to identify and report outbreaks and initiate elementary containment measures in collaboration with the community.

6. EPIDEMIOLOGICAL SERVICES DEVELOPMENT IN INDIA

*R.S. Sharma**

Introduction

Epidemiological services have key-role in planning and evaluation of universal comprehensive primary health eare, to attain the goal of 'Health for All by 2000 AD'. The epidemiological indices pertaining to fertility, mo tality, MCH, immunization coverage, communicable diseases control, etc. are targetted to be achieved by 1985, 1990 and 2000 AD, as laid in our National Health Policy. We have a net-work of health infrastructure at community level like community health workers and multipurpose workers followed by bottom to top pyramid of health services staffing-pattern. But, the epidemics mostly remain undetected or are detected in late declining phase by the agencies other than health staff. The data on morbidity/ mortality is collected by the Central Bureau of Health Intelligence, different diseases control/eradication programmes, various health services, institutions like National Institute of Communicable Diseases (NICD), periodic surveys and epidemic investigations etc. The information so collected is not precise enough to help in planning process, evaluation of primary health care approach and for early detection/forecasting of epidemics.

6.1 Components and concepts

The epidemiological services in the country may be developed under the following concepts having broad components as follows :

(i) Development of epidemiological training for professional/carrier specialist epidemiologists ;

(ii) Promotion/development of epidemiological survillance :,

(iii) Re-organisation of existing health infrastructure at different levels, in tune with the requirement of epidemiological services vis-a-vis primary health care. Additional inputs may be required.

(iv) Promotion of applied field research.

(v) Development of behaviour epidemiology.

(vi) Development of clinical epidemiology.

(vii) Development of laboratory services at primary health care level.

(viii) Application of managements techniques in health services.

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6.2 Current status and plans

(a) Training

The National Institute of Commnicable Diseases (NICD) is one of the premier institutes in the country, which has been actively engaged in the development of epidemiological training. In-services training courses in epidemiology of national and international levels were started by the Institute, more than 20 years back. The courses were modified from time to time according to the requirements and presently orientation training course is being conducted at the institute for district level medical officer. All India Institute of Hygiene and Public Health (AIIH&PH), Calcutta and Institute of Rural Health and Family Welfare, Gandhigram, are also participating in the training programme. National Institute of Health and Family Welfare (NIHFW) has prepared self learning modules on epidemiological training of medical officers of Primary Health Centres. Field training programme in epidemiology developed on the pattern of Epidemic Intelligence Service (EIS) training of Centre for Disease Control (CDC), Atlanta, U.S.A and successfully conducted in Thailand, Indonesia, Taiwan, Saudi Arabia and Mexico, is being started in collaboration with C.D.C. and USAID. World Health Organization (WHO) is also collaborating in the training programme. There will be 6 weeks class-room didactic teaching at NICD, followed by 10 months field training in the States. It will be closely co-ordinated with the development of Public Health Laboratory services. To start with Maharashtra has been selected as Model State and Tamil Nadu as Principal training state. Subsequently, the project will be extended to Uttar Pradesh and other States.

National Board of Examination started postgraduate examination in epidemiology in 1978, but had to stop it after about five years due to its non-recognition by the Medical Council of India. There is an urgent need to start MD in epidemiology by the Universities, medical colleges and post-graduate Institutes, if we want to have career professionals and specialist epidemiologists, required for an effective epidemiological services at district, divisional, state, regional and national levels. Training in epidemiology in India was reviewed by the author (i), with special reference to the current status and needs.

(b) Applied field research and development of surveillance

The field studies on development of epidemiological surveillance of five epidemic-prone diseases, namely diarrhoeal diseases, poliomyelitis, measles, viral hepatitis and Japanese encephalitis were undertaken during 1983-86 in five districts viz. Alwar (Rajasthan), West Godavari (Andhra

Pradesh), Mysore (Karnataka), Gurgaon (Haryana) and Nadia (West Bengal). It was community/village level weekly 'lay-reporting' system through multi-purpose workers to Primary Health Centres and districts. It has been found that it is operationally feasible to improve our surveillance for early detection of epidemics by optimum utilization of the existing health infrastructure. With the community level active surveillance, the number of cases reported are much higher than that by the routine institutional reporting. Average monthly incidence by this 'lay reporting' surveillance, in rural area of one district each of Karnataka, Andhra Pradesh and Rajasthan were found as follows :

Disease	Ave. monthly incidence rates in Mysore	East Godavari	Alwar
<5 years			
1. Diarrhoea (per 1000)	9.7	7.0	2.9
2. Measles (per 1 lakh)	124.8	33.3	8.1
3. Poliomyelitis (per million)	10.6	7.2	46.0
All ages			
4. Jaundice (per million rural)	19-0	214.0	8.7

The project was assessed in Alwar district of Rajasthan by sample survey of the same diseases. The incidence of those diseases have been found to be as follows : Diarrhoeal diseases 58 per 1000 children of under 5 years per fortnight ; measles 16 per 1000 children of under 2 years per half year ; and viral hepatitis (all ages) 73.5 per 0.1 million per half-year. The prevalence of poliomyelitis lameness was 13 per 1000 children of 5-9 years.

The 'Correction factors' were determined for application to the data generated by the routine community/village level surveillance, after adjusting lay-reporting efficiency and the degree/extent of reporting regularly. It has been observed that the magnitude of these diseases may be obtained by multiplying the surveillance data by the following factors : diarrhoeal diseases-21.9 ; measles-1.8 ; and viral hepatitis-17.5.

National diarrhoeal diseases survey has been carried out in 11 centres (7 urban and 4 rural). It has been estimated that on an average a child of less than 5 years suffers from 1.8, 2 and 4.5 episodes of diarrhea in urban, urban-slums and rural areas respectively. It is estimated that in India about 0.5 million children of <5 years die of diarrhea every year. While Oral Rehydration Salt (ORS) is used for one-fourth of diarrhea cases, Oral Rehydration Treatment (ORT) with locally available fluids is used in more than 75 per cent of cases.

A cell for monitoring of 11 epidemic diseaes has been established at NICD. Large number of epidemics are being investigated by NICD and other Institution. National sample survey for comprehensive general health study of populations needs to be started. This will indicate the overall impact of health services provided during the past 40 years and will be useful for future planning.

At the initiative of NICD, certain steps have been taken to improve the epidemiological services by re-organizing the existing health infrastructure or by recommending the expansion programme during the plan periods. Programme Officers for Epidemiological Services have been identified in every state. Teams have been formed by the State epidemiologist at state/ zone/district level. Annual meeting of the Programme Officers, of epidemiological services are held at NICD since 1984. Progress in different states is periodically reviewed and NICD also provides feed-back by publishing booklets such as 'Development of epidemiological services' etc.

6.3 National Programmes : In addition to the existing national health and disease control programmes, the following disease have been taken-up recently or are being considered for surveillance viz Viral Hepatitis, Acquired Immune Deficiency Syndrome, Rabies, Acute Respiratory Infections etc. Non-communicable diseases currenty attracting the attention of the planners are dental health. mental health, cancer and cardio-vascular diseases.

Three Medical Colleges have been selected to develop clinical epidemiology. The clinical epidemiology may be incorporated in our medical education as a part of the epidemiological training. Under a clinical setting physicians trained in epidemiology can be more effective and efficient to promote preventive medicine. A more rational approach can be applied for priority allocation of limited resources for medical care and prevention. A working relationship with the International Clinical Epidemiology is the recent development in surveillance programme. It covers surveillance of population behaviour responsible for disease occurance. It is very useful for forecasting of epidemics of chronic diseases for example surveillance of smoking habits may indicate future trends in lung cancer. Behaviour epidemiology and environmental health surveillance needs to be developed in India. The application of modern management techniques in health services administration is another area which cannot be over emphasised.

References

(i) Sharma, R.S. Training in epidemiology in India :
Current status and Needs.
J. Indian Medical Assocation,
82 (10), October 1984, pp. 382-384.

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7. PLAN FOR FIELD ORIENTED EPIDEMIOLOGY TRAINING

*Dr. Kenneth Bart**

7.1 Health Situation

An essential prerequisite for any planning related to health services or health manpower development is to review health situation. In reviewing health situation in India, Planning Commission points out that, there has been only limited application of proven technologies which are immediately available to deal with the major health problems that are within the limited resources of the existing health system at a cost which can be absorbed and sustained :

Oral rehydration

Immunization

Contraception

Protection of water supplies

Chlorination, etc.

REASONS

In part this is due to :

- The absence of accurate data that has inhibited the recognition of principal causes of morbidity and mortality e.g. measles.
- The lack of continuous monitoring capability to assess secular trends and changes related to intervention progammes.
- The limited number of epidemiological staff capable of undertaking assessment and investigation at the field level.

7.2 Policy Development

In 1979 a National Workshop on Epidemiology took note of the need for enhanced epidemiological services and recommended :

- A 3-tiered epidemiological service be developed (Centre, State, District) throughout the country as an integral part of the health services.

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- That senior management officers be designated at the state levlel as Directors of Epidemiological services.
- That an epidemiological unit be established at each state.
- That public health laboratory services be established at State, District and Primary Health Centre levels and that they become an integral part of the epidemiological services.

1982—Statement of National Health Policy
(Basic for 7th Plan)

- .....to reorient medical education and the health care delivery system to provide a more focussed service orientation with greater emphasis on.....prevention rather than curative interventions.

Health targets of birth rate and infant mortality for the year 2000 were established.

The targets are to be achieved through : (4 principals)

(1) A greatly expanded health infrastructure delivering focussed maternal, child and family planning services.

(2) A reorientation of medical education with greater emphasis on the roles of clinical departments as well as departments of Social and Preventive Medicine so that at least 50% of clinical medical education will take place at the primary health care level.

(3) The introduction of epidemiological and complementary public health laboratory services at the State and district level and

(4) The development of a functional health information system which can be used both for disease control/eradication and management purposes,

7.3 Requirements

In several meetings and seminars held since 1983 it has been recognized that each epidemiological Unit (Urban & Rural) would require suitably trained and equipped staff capable of identifying, planning and providing preventive and promotive services. Reference of these seminars and major recommendations are given as under

- 1983—Workshop on the development of Epidemiological services
  —8th Joint Meeting of Central Council of Health & Family Welfare
- Nov 1983—Workshop on the Control of Communicable Diseases & the Control of Blindness.

- Feb 1984—2nd Workshop on Development of Epidemiological Services, delineated the functions of these services, organizational relationships and staffing pattern.
- Oct 1984—States requested to designate a senior Medical Officer as Programme Officer of Epidemiological Services.

Preparation for 7th Plan

- A basic document for epidemiological Services in the 7th plan
- A proposal for strengthening NICD.

7.4 Prior Efforts in epidemiological surveillance

- 1983—NICD/WHO collaborated in the development of a model for strengthening epidemiological services in 4 districts (in 4 states) for 5 diseases. The model demonstrated the utility of active surveillance not only for diseases but also for infant deaths. This model can be used for national replications.

7.5 Trained manpower and nature of existing training in epidemiology

A small number of trained and experienced epidemiologists and a number of well equipped public health laboratories and other support facilities exist at several research, academic and service institutions throughout the country. However, for the most part no posts, units or cells are designated nor activated to carry out epidemiological functions.

Training in epidemiology in the country is traditionally didactic and academic. The graduates usually are unable to apply epidemiology as a practitioner.

7.6 What does the job in epidemiological services call for ?

(Feb 1984 Meeting on Development of Epidemiological Services)

- Plan and organize epidemiological services in close collaboration with public health laboratories.
- Organize, implement, assess and disseminate data from the surveillance system.
- Monitor the occurrence of trends in disease from the continuous review of collected data so as to anticipate the occurrence of outbreaks and the identification of priority health problems.
- Undertake the investigation and control of outbreaks of disease.
- Provide guidance in the application of control measures.

- Organise periodic surveys to prepare profiles of prevalent diseases.
- Assist with the evaluation and planning of health programmes.
- Organise and conduct training of health personnel in the surveillance and control of disease.

7.7 Proposal : Develop 'Practitioners' of Epidemiology

In response to a request from the Ministry of Health under the auspices of CDC/Atlanta, a review was made with the collaboration of central and state Planning, Health and Administrative Officers, with a view to :

(1) develop an one year certificate programme recognised by the National Academy of Medical Science (Figure) : Problem-Solving Case-Method approach,

(2) development of technical cadre of epidemiologists,

(3) arrangement of annual meetings,

(4) faculty devlopment (NICD as focus),

(5) strengthen NICD to convert it as as a National Epidemiological and Laboratory Reference Centre,

(6) develop computer capabilities at centre and state levels,

(7) build on the achievements of earlier experiments,

(8) plan demonstration Projects,

—Training State

—Demonstration State, fully funtioning

7.8 Proposed field-oriented epidemiological training*

Didactic Training (including 4 wks of specific programme experience)	Field Experience under Tutor 1 : 4.5	Review & Consolidation, Report Writing	Annual Conference (s)
3 Months	9 Months	2 weeks	3 days

*2nd Year of Collaboration after return to States or District.

7·9 Field Experience

— The filed pracfice is intended to be a work-like situation at the State or District level to facilitate the integration of knowledge and skills to produce a service orientation. (Not dissimilar from mandate to have clinical/medical training at the primary care level).

— Students are expected to apply the knowledge and skills acquired during the didactic portion of the training. This is intended to enhance the trainees' ;

—Technical competence,
—Independent judgement and
—Decision-making capability ;

..... So they can undertake similar epidemiological activities when they return to to the State/District.

During a period of 9 months the trainees are expected to :

(1) Review the surveillance data of all notifiable diseases.

(2) Collect, analyse and present basic epidemiological information on one principal health problem in their State/District and write a report for presentation.

(3) Conduct a primary investigation of atleast 2 (two) outbreaks which would include collecting of laboratory specimens and their interpretation, and applying or supervising the application of control or prevention measures ; write a report on each outbreak.

(4) Use the microcomputers to analyse data from a surveillance project and an outbreak investigation.

(5) Prepare a report of one of the outbreaks for presentation at the Annual Conference.

7.10 Outcomes of training

'Able to Do/Understand/Explain'

(1) Understand principles of epidemiology, Biostatics and specific diseases of importance.

(2) Understand job descriptions.

(3) Understand global and country objectives.

(4) Understand and be able to 'practice' epidemiology.

(5) Understand and be able to to calculate health and disease indices.

(6) Understand the principal communicable diseases prevalent and what can be done to control/prevent their occurrence.

(7) Understand the principles and role of human reproduction in public health.

(8) Understand the use of the public health laboratory.

(9) Understand the role and appropriate use of paraprofessional personnel.

(10) Understand the role of the Supervisor.

(11) Understand and be able to apply management principles.

8. PLANNING OF EDUCATIONAL CURRICULUM IN EPIDEMIOLOGY

*Dr. L.B.S. Dey**

8.1 Introduction

Epidemiology is the basic discipline for all concerned with delivery of national health services. It is used for measurement of present health needs of a population, for determination of health priorities and for evaluation of health services activities. The epidemiological data enable health services administrators to define sub-groups within a general population which are at special risk to a particular disease or hazard so that appropriate action can be taken. Systematic epidemiological surveillance provides early warning of the onset of major communicable and non-communicable diseases or epidemics. Epidemiological knowledge also help in deciding on suitable disease control measures.

Epidemiology has major contribution to medical education. It is not only the basic science of social and preventive medicine, it has a place in laboratory science and in clinical medicine. A studnt's understanding of anatomy, physiology and biochemistry will be seriously deficient if he does not appreciate the variabilities of physical, physiological biochemical and other attributes in general population and understand that it is rarely possible to draw a clear line between normal and pathological. In the clinical disciplines knowledge of prevalence, aetiology and prognosis derived from epidemiological research has obvious implications for the diagnosis and management of individual patients and of their families.

In most South-East Asian region countries at present epidemiological services are either rudimentary or grossly inadequate. The important role of this service is not well appreciated. Yet the success of eradication of smallpox in India and elsewhere was mainly due to proper and adequate application of right epidemiological measures. Need for strengthening of epidemiological services have been amply stressed in India's national health policy.[1] Govt. of India is committed to the goal of achieving health for all by the year 2000 A.D. through provision of universal comprehensive primary health care especially to the underprevilaged popblation in

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rural areas and urban slums. One of the major strategies is to reduce morbidity & mortality of population especially in the infants and underfive children. Governments 20 point programme lays great importance on M.C.H., Family Welfare, Nutrition and control if possible eradication comminucable diseases. These are heavily depandant upon epidemiological services for their planning, implementation and monitoring. Therefore, the Govt. of India has initiated steps to strengthen epidemiological services at all levels of health services administration, with special emphasis to the district level[2]. The organizational structure envisaged for epidemiological services at various levels will require different categories of medical and paramedical personnel (Appendix-I). Besides professional epidemiologists number of medical, statistical and laboratory personnel will need workable knowledge in epidemiology.

In India, and many other developing countries there is a shortage of professional epidemiologists in Govt. Health Services. Limited career opportunity, lower social and financial position than that available to the clinical colleagues are some of the reasons[3].

However, to meet the present requirement of trained personnel for epidemiological services well organized training programmes are necessary for different categories of staffs. For this considerable amount of planning is necessary.

8.2 Training programme in India and abroad

Graduate and Undergraduate training programme in India and some other countries are described in brief to provide an insight into the planning of epidemiological training programme.

— Traditionally epidemiological training is imparted through (1) Short course, (2) Inservice training and (3) Academic course. Many countries run short courses in epidemiology lasting from one week to six months, However, due to limited and inadequate field work they are not suitable for preparing professional epidemiologist. Inservice training has been used in several countries including India for professional and para-professionals. In India, National Institute Communicable Diseases (NICD) is at present running 3 weeks courses on Epidemiological services development and Epidemiological health planning. However, in India the courses are mostly for short period. Some long-term courses are known to be held in USA (extending from 2-3 years) and in Poland (3 years). Academic courses

are mostly in the form of post-graduate Diploma and Degree courses or Ph.D programmes in epidemiology. In India post-graduate degree & Diploma courses are held in Social and Preventive Medicine/Public Health and Degree in Community Health Administration, where in Epidemiology is one of the subject.

Highlights of post-graduate training in epidemiology in different countries are placed below :

8.2.1 India—NICD was previously arranging 3 months intensive course of epidemiology and control of communicable diseases. In thase courses usually candidates from different states at the District level and lecturers from different medical colleges used to attend as particpent. Now, the institute runs courses of 3 weeks duration onlv on epidemiological services for medical officers at district level.

In this course the following subjects are covered :

(i) General Epidemiology

(ii) Epidemiological Principles

(iii) Epidemiological methods

(iv) Epidemiological surveillance including survey

(v) Laboratory services in epidemiology

(vi) Entomology including vector control

(vii) Epidemiology of specific diseases

(viii) National Health Programmes

(ix) Epidemic Investigation

(x) Field exercises of 3 days duration

(xi) Review of a current problems using the above tools.

The programme includes lectures by experts in microbiology, zoonosis, national level programme officers, administrators, eminent teachers from premier medical colleges, Research Institutions, members of planning commission etc. This also includes problem solving exercises working on self instruction modules etc.

8.2.2 U.S.—In this emphasis is given on extensive reading and writing of criticnl essay and exercises out of class.

First Year—I. Origin and control of diseases including effects of ecological forces and changes in social structure. A holistic approach is taken to diseases both communicable and non-communicable (20 hours of class work).

II. A board survey of methods and techniques in epidemiology, formulation of hypothesis, concept of work management of hospital infection, serological epidemiology etc.

III. Statistics—Frequency distribution, trend of probability, test of significance, use of Chi Square, goodness of fit, analysis of variance, correlation and regression, epidemic models, Life table techniques, sampling techniques, standardisation, coding, processing of data.

Second year—Specialisation in communicable diseases, non communicable diseases or mental disease,

Subsequent years—Research project-Design, execution, analysis and thesis writing.

8 2.3 U.K—Epidemiology course for warkersin tropical public health include

I. six 2-hour sessions on practical application of statistical techniques in epidemiology, clinical medicine and the planning of health services,

II. epidemiology course comprises 20 sessions. Highlights are

—Basic principles of epidemiology

—Systematic investigation of infectious diseases

—Epidemiological methods in non-communicable diseases

—Occupational hazards

—Principles underlying survey

—Use of life-tables, assocation of demographic techniques with epidemiology.

8.2.4 Japan—One months refresher course for health administration in Japan which include following subjects

(1) Recent Advances in epidemiology.
(2) Epidemiological survey methods.
(3) Planning and conduct of an epidemiological survey.
(4) Routinely collected statistics.
(5) Case studies of epidemiological investigation.
(6) The electrionic computers and its application.
(7) Statistical methods.
(8) Serological epidemiology.
(9) Recent advances in laboratory techniques.
(10) Exercise on an epidemic.

(11) Epidemiological surveillance.

(12) Practical review of epidemiological approaches to various health problems.

8.2.5 Czechoslovakia—Subjects included in 2 weeks refresher course for field epidemiologists are ;

—Current disease specific epidemiology.

—Present problems in population policy.

—Vaccination programme.

—Present results of some epidemiological research, use of epidemiological methods in general medicine.

—Surveillance.

—Present situation of the development of epidemiological services in the world.

8.2.6 Thailand Programme—In June 1980, the Min. of Public Health, Thailand in collaboration with WHO & C.D.C. Atlanta, U.S.A.I.D. has initiated a field epidemiological training programme (US Deptt. of Health & Human Services).

Participants of the programme are selected from physicians who have completed 2 years of service with the Government or in rural areas. The candidates continue to receive a regular government salary and benefits.

The programme begins with 4 weeks introductory course on general epidemiology, biostatistics, selected infectious and non-infectious diseases. Approximately, a 3rd of the time is spent on problem solving exercises. At the end of the course trainees take part in immunization coverage surveys.

After introductory course the trainees are rotated through different divisions in the Ministry for a period of 2-3 months in each division. During rotation practical projects are undertaken on which reports are prepared for formal presentation. During the first year investigation of outbreaks are also undertaken. At the end of first year, the trainees prepare problem solving exercises which they then teach in the introductory course.

In the second year trainees are assigned specific division in the Ministry or regional/provincial health offices. There, they carry out disease survillance. investigation of cases or epidemics and epidemiological research (descriptive or analytical in nature).

Weekly lectures and meetings are held throughout the year covering wide range of topics viz. drug addiction, road accidents, cancer, immunology, mal-nutrition, environmental and occupational health, uses of epidemiology in programme planning and biostatistics.

On evaluation of the course it was found that during training all the trainees were useful to their division, carrying out investigation, preparing teaching materials and courses, writing surveillance report and helping to plan and evaluate control measures.

8 2.7 Undergraduate Teaching programme

The undergraduate students should be given an epidemiological bias so that they can use this knowledge in general practice or in Govt. Health Service.

Most teaching courses in epidemiology contains the following elements :

(1) The meaning and scope of Epidemiology.

(2) Epidemiological methods.

(3) Epidemiology of communicable diseases and method of control/ eradication of communicable diseases at local national and international level.

(4) Epidemiology of non-communicable diseases.

(5) The application of Epidemiological methods to the planning and evaluation of health Services.

An outline of the teaching programmes in Tanzania, Nigeria, Venzuela, U.K. and Poland is given in the Appendix-II. The teaching curriculums are designed to cater for health needs in a particular country.

8.3 Planning educational curriculum

8.3.1 General principles

The purpose of an educational procedure is to bring about planned and measurable changes in the behaviour. The focal point of the procedure is a student working to reach a defined goal. Hence first step in any educational planning must be to formulate the objectives to define unequivocally what knowledge, skills and attitudes he should acquire at the end of the educational process i.e. what should he know and that he should be able to do after the training. The training programme shou'd be designed to meet the national needs[5] taking into account the background of the

trainees (US Dept. of Health & Human Services) and the position trainees will assume on completing the programme and the resources available.

Once the objetives have been defined, course curriculum and particular methodology can be designed to help the trainees to attain them.

Fanally, an evaluation is needed to provide feed back to the teachers. In the light of that evaluation the objectives and curriculum can then be re-examined and readjusted.

8.3.2 Definition of objective :

The broad objective of training programme in epidemiology in India could be (1) to improve epidemiological services and to develop teams of motivated and committed professionals ; (2) to orient undergraduate level students in usefulness of epidemiology in both public health and clinical medicine.

Educational objective should be defined not only for the whole training programme but for each of its components i.e. down to the smallest units e.g. single lecture, discussion, practical classes, field work.

Since development of epidemiological services is primarily to meet the national needs the detalied educational objectives would have to include all programmes of national priority. Again since primary health care has to be achieved through socially acceptable methods and techniques with the full participation of the community, understanding essential principles in medical sociology and its implication and application is necessary. Another area in which national health policy has given such stress is development of an health information system.

As an epidemiologist has to make considerable contribution, in research and in planning, and evaluation of health services he has to be acquainted with research methodology, principles of planning and evaluation.

8.3.3 Detailed objectives

To fulfil above objectives the training pragramme should include more detailed objects to develop knowledge, skills, attitude and values in following subjects ;

1. Entomology & Vector Control.
2. Medical Sociology.
3. Biostatistics (methods of collection, handling & analysis of data & sampling methods)
4. Demography and population control.

5. Basic concepts of empidemiology, epidemiological principles and methods.
6. National Health programmes.
7. Epidemiology of specific diseases (important communicable and non-communicable diseases).
8. Rapid diagnostic methods and methods of sample collection and transfer of samples to district or central laboratory.
9. Epidemiological surveillance.
10. Research methodology and survey.
11. Principles of Planning and evaluation.

The educational objectives should further define terminal behaviour, level of competence each trainee must achieve and the circumstances under which this competence must be demonstrated.

8.3.4 For whom the training programme should be aimed at ?

The training programmes can be aimed at (a) Inservice personnel engaged in Govt. health programmes, (b) under-graduate and graduate medical students, (c) Paramedical trainees.

In respect of inservice personnel separate training programme has to be made for medical and para-medical personnel suiting to their level of competence and job assignments. Looking at the proposed organisation for epidemiological services, training programme has to be designed for following category of staffs :

1. Professional epidemiologist the persons with post-graduate qualification in public health.
2. Medical Officer at District and Primary Health centre level.
3. Microbiologist/Biochemist.
4 Health supervisors.
5. Health workers.
6. Statistical Officer/Statistical Investigator/Statistical Assistant.
7. Laboratory Technician.

Top-most priority is to be given for inservice training of Medical Officers at District and Primary Health Centre level and health supervisors.

In training of health supervisors and health workers the objective will be to provide knowledge on general principles of epidemiology, national health policy and programmes, methods of survillance, simple statistical methods of consolidation and presentation of data (in tables and chart from). Special care has to be taken to make them understand for themselves

the result of control measures in his area through surveillancc work. Right attitude has to be developed towards surveillance and health information system, highlighting the relevance of health information in context of country's health programme.

8.3.6 Selection of trainees—Trainees for inservice training should be selected from those having 2-5 years of service in a particular position.

8.3.7 Methodology of training :

This should include lecture, discussion, demonstration working on self-instruction module, doing problem solving exercises, working on practical exercises than didactic training. The training process should not end in completion of the course. While adequate supervision of the trainees the training period is essential repeated training and continude supervision during will be necessary. Further there should be sustained relationship between trainees and training institution through periodicals, publications etc.

8.3.8 Evaluation : Evaluation of training programme should be an integral part of the programme for making improvement in training.

References :

1. Statement of National Healtn Policy, Govt. of India, Ministry of Health and Family Welfare, New Delhi 1982
2. Development of Epidemiological Services A report of the National Meeting on Epidemiological services, 18-20 Dec. 1984, Directorate General of Health services, Govt. of India—1985.
3. W.H.O. weekly Epidemiological record 249 (1981).
4. Lower, C.R., Kostrzewski, Epidemiology-A Guide to Teaching Methods, Pule. Churchill Living Stone.
5. W.H.O. offset publication No-35, Educational Hand book for Health personnel ; W.H.O., Geneva 1981.

ANNEXURE—I

Proposed organizational set up of Epidemiological Services

State Epidemiological Bureau

State Epidemiologists

Field Epidemiology Unit	Health Intelligence Unit	Public Health Lab.
Asstt. Epidemiologist-2	Statistical Officer-2	
Field Investigator-2	Statistical Investigator-1	
	Statistical Assistant-2	
	Programme-2	

District Epidemiological Wing

District epidemiologist

Field Epidemiology Unit	Statistical Uuit	Public Health Lab.
Medical Officer-1	Statistical Officer-1	Microbiologist-1
Health Supervisor-2	Statistical Investigator-1	Biochemist-1
Health Worker-2	Statistical Asstt.-1	Lab. Technician-2
Draftsman-1		Lab. Asstt.-4

Annexure—II

Undergraduate teaching programme in some countries

Teaching programme in Tanzania

Great majority of medical students are likely to work as G.D.M.O. in Govt. Health Services. The job description of the G.D.M.O. provides the basis for the general educational objectives of the Tanzania medical schools. The course is spreaded over 5 academic years in following manner.

		Approx. hours
First year	Behavioural Science	40
	Biostatistics	20
	Demography	14
	Community field projects	3 weeks
Second year	Epidemiology	40
	Parasitology and entomology	60
	Environmental sanitation	20
	Family care study	20

Third Year	Organization of Health Service	
	Medical administration	40
	Applied nutrition	20
	Health Education and teaching techniques.	20
	Occupational health	5
	Family Planning	8
Fourth Year	Community health clerkship	8 weeks
Fifth year	Social & Preventive Medicine revision and reports.	40

Teaching Programme in Nigeria

First year	Preventive Medicine (Man & his environment)	20 hrs.
	Statistics	20 hrs.
Holiday assignment :—	To write essay on some aspects of life & culture in students own local community including community beliefs and practices.	
Second year	Man & his environment (Conted.....) Environmental sanitation.	
Third year	Epidemiology & Control of Diseases	
Fourth year	Nil	
Fifth year	Seminars to integrate the knowledge and information.	

Teaching programme in Venezuela

Second preclinical year	Introduction to Health and Diseases Man & Environment, Epidemiology Biostatistics, Epidemiological Methods.	7 lectures in week 1, 2 & 3
	Practical on handling the Epidemiology & vital statistics.	
	Preventive medicine : Modern concept	2 lecture weekly
	Biostatistics, Practical on computation of indicators and trends,	
	Economic & Social cultural factors of disease,	3 lecture in week 5, 6

	Practil on Immunization Social structure, stratification, social groups, interview techniques, Family Social changes and its deterimants	7 lecture week 7-11
	Community Development ; the physicians as an instigator and leader of change.	7 lecture in 3 week 12-14
	Human relation. Health Education	1 lecture 15th week.
	Practical on com-munity development, immunisation.	
	Epidemiological survey and its interpretation, immunisation.	Week 18-22
	Epidemiology and prevention of defficiency disease, dental caries, endemic goiter, Diarrhoeal diseases, waterborne diseases, poliomyelitis tetanus, zoonosis (with emphasis on rabies).	9 lectures in weeks 23-32
	Field visits & discussion on rural water supply, Pasteurization, Food production, Plants.	Weekly 26-29
First clinical year.	Environmental sanitation, Epidemilology & prevention of helminthiasis	6 lectures in 2 weeks.
Field Visit :	An enchocirciasis field station. A Municipal slaughter house. Bilharziasis control and Latrine programme, Visit to Chagas disease centre, Visit to Malaria area, Corpological practice in rural area.	7 visits in 5 weeks
	Films review/discussion.	3 sessions in 3 weeks
	Practical-Parasitology Lab.	2 pract. in 2 weeks

The last 15 weeks of the course are devoted first to epidemiology and prevention of certain diseases viz. STD, ARI, TB, Cancer, CVS disease (12 lectures) and then to the main occupational health problems (12

lectures). Field visits are arranged to T.B. clinic, STD clinic, Cancer clinic & & factory. The student hours allotted for the courses (including lectures, practicals, field visits, seminars, examination and others) are 77 & 90 in 2nd and 3rd year respectively.

A teaching programme in London

First clinical year
Lecture — Basic concepts of epidemiology Describing ill health in communities Community medical care system.

Ward round — Management of particular clinical problem to consider aetiology and prevention in the light of epidemiological evidence.

Lectures include :—

1. Primary Medical Care
2. Accidents
3 Drug addiction
4. Disabilities
5. Occupational health
6. Screening for Disease
7. Mental illness
8. Care of the aged
9. International Medical Care
10. Care of mentally subnormal
11. New aspects of Medical care.

Second clinical year

Home visits :— To know about prevalence and incidence of disease within community ; the influence of social and psycological factors on the presentation, impact and management of the diseases and the organization of services in the community and their interdependance with those of hospitals.

9. TEACHING OF EPIDEMIOLOGY IN UNDER-GRADUATE MEDICAL EDUCATION

Dr. R.D. Bansal, * *Dr. D. Bachani***

9.1 Introduction :

The quality of medical care provided in community is directly related to the production of health manpower which should be fully equipped with knowledge and skills to provide appropriate and timely health care to the beneficiaries. It has to be planned in view of health needs of the community and according to availability of resources and technology. Unfortunately there has been tendency to overemphasize the most sophisticated technology as the ultimate answer which a country like India can hardly afford.

Medical teaching and training pattern in India at undergraduate and postgraduate level has been a matter of criticism for a long time. It has been shown that hospital based, cure oriented approach is a complete failure[1]. Generally speaking, a medical graduate after passing through six years of medical education is bewildered and finds himself groping amongst a few pharmaceutical names only. He can not be regarded as the pioneer of providing comprehensive health care to the community in whatever way he renders his services.

Only recently the Reorientation of Medical Education scheme[2] has been implemented in medical colleges of India. But unless there is a proper understanding amongst the teachers of medical institutions and until the objectives of the scheme are taken care of it is going to be another refuse in the dustbin of high level policies and programmes.

In developing countries where more than three quarters of total morbidity is because of infections and malnutrition, there is further need and importance of teaching and training, of infectious disease and nutrition in particular. Tuberculosis, Malaria, Filariasis, Leprosy and enteric infections are at the helm of morbidity pattern and cause widespread mortality as well[3].

9.2 Existing Teaching Methodology

With minor differences and exceptions aside, the teaching and training of epidemiology in majority of institutions is irrational. The theoretical aspects of epidemiology are taught in second phase of M.B.B.S. by the

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Departement of Preventive and Social Medicine, now called department of community Medicne. The teaching does not detail out clinical aspects because of two reasons :

(i) As the students are still in para-clinical phase, it is thought to be untimely and premature.

(ii) The teachers of Preventive and Social Medicine are usually not associated with hospitals and thus they are not fully equipped with clinical teaching.

In the final clinical phase, the students are taught and trained solely about clinical picture of diseases without mentioning the epidemiological characteristics of the disease. The teachers of medicine are not reoriented in the needed manner of epidemiological understanding. The outcome is, as expected, unsatisfactory. The student who now becomes a medical graduate is filled with symptoms, signs and syndromes without any understanding of epidemiological lay out. Thus he observes a patient as a single entity and a disease as a single episode without bothering for its origin and causation, the underlying factors and the community implications. The measures taken are therefore unit-based. The whole chain of complex events have been in progress for so many years and inspite of the fact that new drugs and better technology is available the situation of communicable disease has remained same or worsened in some diseases. We have not been able to control Malaria, Filariasis, Venerial Diseases and Tuberculosis as a consequence only of inadequate approach to teaching and practice of Medicine. The resources go waste, the basic health needs of the people remain the same, the economic stagnation stays and what we gain is ever-increasing disease load, malnourished future population, deteriorating brain-power, human garbage and a handful of practising giants. There is no one else to blame except providers of medical education and health care.

9.3 Lacunae in the teaching of Epidemiology

- Not competency based
- Educational objectives and course curriculum — Not relevant to National Health Policy and Health for all by 2000 AD
- Taught by P.S.M. Department mostly.
- Little involvement of other departments and Directorate of Health Services.
- Inadequate time for theory and practical work—in undergraduate period and during in Internship

- Less field training and involvement in live situations at micro-level.
- Far too few Epidemiological exercises/Clinico-social case reviews done if at all.
- Evaluation at university level only.

9.4 The 'Intergrated' Model

In the prssent situation, teaching of epidemiology particularly of communicable diseases, needs dramatic changes. A model has been framed in this regard keeping in view the following aspects :—

- The teaching should be need-oriented and competency based.
- Educational objectives should be made followed by course curriculum.
- Clinical training should be 'integrated' with right emphasis on individual and community orientation.
- The teaching should be comprehensive with right emphasis on promotive, preventive and curative aspects of health care and rehabilitative aspects wherever needed.
- The teaching should not be only hospital based but underlying causes, role of environment and other factors in the community should be incorporated.
- The teaching should not be based on high level technology alone in investigations and management but also dependable on available resources and aids.

Keeping in view these aspects, some prerequisites are essential. The teaching should emphasize commoner conditions prevalent in the area. The Department of Community Medicine should be regarded as clinecal with an infectious disease ward/hospital. There should be provision of minimum facilities in urban slum and rural area for proper training and residing. The duration of training should be equitably divided in hospital and field situations with care not to hinder relevant knowledge being imparted to students.

9.5 Programme in the model

In this model, the subject of epidemiology extends throughout the paraclinical and clinical phases of undergraduate courses. In the beginning, an understanding of medical sociology and biostatistics should be imparted. In para-clinical phase, after basic knowledge of microbiology and clinical pharmacology have been given, epidemiology should be taught for 4-5 terms in late paraclinical phase and clinical phase. General epidemiology should correspond with clinical methods in Medicine. Once this is achieved,

systemic epidemiology and clinical picture of a disease should be taught and in detailed programmes care should be taken to see that the two pronged teaching correspond disease-wise, as far as possible During ward training and posting, the teaching should be integrated in the wards etc. with participation of faculty members of Departments of Community Medicine and other departments.

During the rural posting of undergraduate students in the final phase, further training by these departments should be undertaken in field conditions with stress on environmental and socio-economic factors. The teaching should include :

(i) individual case studies with community implications,
(ii) epidemiological studies of prevalent diseases in the community,
(iii) family study of infectious diseases in field practice areas,
(iv) assessment of Community Health.

Emphasis should be put on diagnosis and management of particular disease in rural areas with minimum laboratory aids and treatment facilities.

9.6 Internship Programme

Community posting of 3 to 6 months during internship can be vitally utilised for training in epidemiology. In the urban areas, besides posting in the infectious disease word/hospital, small postings, of week or fortnight duration, in District Tuberculosis Centre (D.T.C.), Malaria Centre, Leprosy Unit etc. may be beneficial. In the rural posting the interns can be trained in implementation of various national vertical programmes in collaboration with clinical departments and Directorate of Health Services. Field studies, Family Health Care Programme and seminars and discussions can be arranged in the area. The interns can be posted at sub-centres where they can learn administration and management aspects. peoples' participation and total health care concepts. In abopted Primars Health Centres under the scheme of R.O.M.E. there is wide scope of integrated teaching of students and interns. The visiting specialist alongwith the community physician can discuss the morbidity in the area and they combinedly can train interns, the epidemiological concepts of diseases prevalent there.

Researchers have time and again recommended team approach. It has been rightly said that the specialists have to develop an understanding of and make a commitment to Community Medicine as fundamental as their commitment to superior scientific care[4]. The present model envisages team approach in teaching so as to have a total concept of the situation. The crux of the matter is that we have to develop students intellectually and to

cultivate their intrinsic potentials. The quality and range of knowledge, skills and attitude towards work of future medical graduates will largely determine the health of the community. The teaching and training should be taken in such a way that it is not felt as an undeserving punishment but rather a rewarding experience.

9.7 Suggestions

- Development of competencies, educational objectives and course curriculum and evaluation.
- Recognition of Community Medicine as a clinical subject
- Establishment/development of infectious disease ward/hospital and its link with Community Medicine department.
- Change in examination pattern of Community Medicine, after clinical phase.
- Community posting including posting in rural areas during undergraduate curriculum and internship.
- Reorientation of Staff of Community Medicine towards infectious diseases.
- Reorientation of staff of internal medicine, paediatrics, Obs. & Gynae. and others towards epidemiology.
- Specialist courses of postgraduate levels in epidemiology.
- Eastablishment of perfect liasion between Community Medicine and Internal Medicine.
- Provision of better living and teaching facilities in rural areas including better communication.

REFERENCES

1. Alternate appraoches to meeting Basic Health Needs in Developing Countries. A Joint UNICEF/WHO study, WHO Geneva, 1975, Edited by V. Djukanovic, Epmach.

2. Government of India, Ministry of Health and Famlty Planning (1975) : Report of Group of Medical Education and Support Manpower.

3. Health Statistics of India (1981), Ministry of Information and Broadcasting, Govt. of India, New Delhi.

4. Cherkasky, Martin : 'Medical Manpower needs in deprived areas', J. Medical Education (1969), 44 : 126-131.

5. Rais Ahmed : 'Reorientation in teaching, learning and evaluation, J. Higher Education (1980), 5 : 331-333.

10. POST GRADUATE TRAINING OF EPIDEMIOLOGY

Dr. A.K. Govila

10.1 Existing Post-grduate teaching Programmes

Post graduate training in medical colleges is given in the form of M.D. & Diploma Courses for a duration of 2 years, and one year respectively. For M.D. course the candidate has to undertake a project which is to be submitted in the form of a thesis before the appearance of M.D. examination. In these courses besides class room lecture sessions, the students are exposed to field practices and problem solving exercises.

Didactic lectures of basic epidemiology are arranged for the P.G. students alongwith the undergraduate course. Special lectures once a week are also arranged for the postgraduate students in which special emphasis is given on epidemiological principles. National Health Programmes component of Epidemiological principles its parameters and assessment are discussed with them both in theoretical and practical aspects. Hypothetical problem solving epidemiological cum statistical exercises were given to the PG students and discussed with them for better understanding of the epidemiological techniques. Immunization and Diarrhoeal diseases modules prepared by WHO are also used by post-graduate students, in the manner suggested by WHO. Journals are reviewed periodically in the department in which epidemiological topics including epidemiological investigations reports presented and discussed by the P.G. students alongwith the faculty of PSM. Seminars are organized in the Department periodically in which epidemiological topics are also presented and discussed.

Postgraduate students are involved in the epidemiological investigations as and when outbreaks occur. And they are supposed to prepare the reports under the supervision and guidance of the faculty of Preventive and Social Medicine.

Post-graduate students are also exposed to the public Health Laboratory and water chemistry functioning, to enable them to undertake the epidemiological investigations in a significant manner.

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10.2 Scope for improvement and Recommendations

- For improving the epidemiological teaching training to the post-graduate students, it is recommended that epidemiological unit must be established along with the staff in the Deptt. of P.S.M. as also recommended by M.C I.

- The post-graduate training programme in epidemiology in most of the medical colleges are limping under several constraints. Many of the Medical colleges do not have an epidemiological unit. Adequate facilities for epidemic investigation especially in respect of transport and laboratory facilities are not available. Co-operation of other clinical departments are often lukewarm. There is no direct linkage betweed State Epidemiologist/ State public health authorities with the Medical Colleges and particularly with PSM Deptt.

- Infectious hospital control should be given to the Deptt. of P.S.M. so as to get the epidemiologcal material for the teaching and training in epidemiology.

- ROME Scheme PHC's should be made under the Administrative control of the medical colleges so that the field practice area may be whole heartedly utilized for the epidemiological training.

- Mobility facilities in the form of transport to be provided to the Deptt. of P.S.M. so as to train the P.G. students in the field practice area.

11. ROLE OF ICMR IN EPIDEMIOLOGICAL RESEARCH AND TRAINING

*Dr. N.D. Datta Banik**

11.1 Introduction

Effective control of communicable diseases depends on efficient epidemiological investigation, case detection, notification, isolation and treatment of cases. Success of a control or eradication programme requires promptness in reporting cases, reliable diagnosis and treatment.

From public health point of view the epidemiological services are essential for epidemiological surveillance of the diseases. The Epidemiological surveillance of diseases has been defined as 'the continuing scrutiny of all aspect of occurrence and spread of disease that are pertinent to effective control'. Epidemiological services play a keyrole in effective control of the diseases in India. These investigations and services have become an integral part of various disease control and eradication programmes of all the communicable diseases.

For checking spread of any epidemic, prompt epidemiological investigation towrds determination of focal points, the route of dissemination, sources of infection, and groups of population exposed to immediate risk of infection, is absolutely necessary.

In India number of agencies are engaged in epidemiological investigations and monitoring of communicable disease control programme, some of the important ones are mentioned below :

(A) Through Central Government (DGHS)

1. National Tuberculosis Control Programme
2. National Leprosy Eradication Programme
3. National Malaria Eradication Programme
4. National Filariasis Control Programme
5. National Diarrhoeal Disease Control Programme
6. National Leishmaniasis Control Programme
7. Control Programmes of Sexually Transmitted Diseases (STD)
8. AIDS Control Programme

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The epidemiological Investigations are being carried out by Central Government Institutes like :

—National Institute of Communicable Diseases, Delhi

—National Malaria Eradication Programme (NMEP) Delhi

—All India Institute of Public Health, Calcutta.

(B) Througe ICMR

The ICMR permanent institutes on different communicable Diseases in different states take part in epidemiological investigations of outbreak of diseases. These investigations help in diagnosis of the diseases, determination of focal points and suggest remedial measures. The ICMR research programmes in different communicable diseases, like Tuberculosis, Leprosy, Malaria, Filariasis, Diarrhoeal Diseases, Leishmaniasis, Sexually Transmitted Diseases, Viral Diseases and AIDS are directed to help National Control Programmes operated by DGHS and Ministry of Health and Family Welfare. There are state Epidemiological Units to investigate outbreaks of the Communicable Diseases. Medical Colleges and teaching hospitals are also involved whenever necessary in the conduct of investigations of local epidemics.

11.3 Involvement of ICMR Institutions

Epidemiological Investigations and services undertaken at various ICMR Institutes are briefly recounted in following paragraphs.

(i) Tuberculosis Research Centre, Madras.

It is involved in epidemiological investigations of tuberculosis and has undertaken short course multi-drug chemotherapy regimens in 18 different states of India.

(ii) Central Jalma Institute for Leprosy, Agra.

It is involved in epidemiological investigation on leprosy, early diagnosis of the disease and multi-drug therapy of Leprosy specially bacterial resistant cases. The multi-drug therapy has been introduced in the National Leprosy Eradication Programme.

(iii) Malaria Research Centre, Delhi.

This institute is involved in epidemiological investigation of Malaria. The thrust area of research is demonstration of good results with integrated vector control approach using biological control agents, environmental improvement and chemotherapy. The above method has shown good results in Khera district of Gujarat and it is being extended in different states.

(iv) Vector Control Research Centre, Pondicherry.

This institute is involved in epidemiological investigation and services in Filariasis. The main thrust of research is the Integrated Vector Control Programme against filariasis at Pondicherry.

(v) National Institute of Cholera and Enteric Diseases, Calcutta.

It is well known that acute diarrhoeal diseases are a major cause of morbidity and mortality in India especially in infants and children below 5 years of age. This Institute undertakes epidemiological invesiigation and services in outbreaks of Cholera, diarrhoeal diseases and dysenteries in different parts of India. The research efforts of the Inrtitutes like detection of etiological agents of diarrhoeal diseases, dysenteries, oral rehydration therapy are directed towards strengthening the National Diarrhoeal Disease Control Programme.

(vi) Rajendra Memorial Research Institute of Medical Sciences, Patna.

This Institute is carrying out epidemiological research in Leishmaniasis.

(vii) National Institute of Virology, Pune

This Institute is involved in epidemiological investigation of Japanese Encephalitis, Kyasanur Forest Disease (KFD), Hepatitis and Dengue and Influenza. This Institute undertakes epidemiological investigations during outbreaks of above diseases.

(viii) Entero Virus Research Centre, Bombay.

This Institute if involved in epidemiological investigation of poliomyelitis in Greater Bombay

11.4 Review of inservice, undergraduate, postgraduate and refresher's trainiag programme and current training needs.

(i) At present epidemiological Course and training are being undertaken in Social & Preventive Medicine department of different Medical Colleges. These are however insufficient.

(ii) The research and training components of the programmes need to be stepped up considerably. This should include detailed epidemiological studies of communicable diseases, their mode of transmission, knowledge of vector biology and eco-systems to enable the development of more effective appraoches to the control of vector-borne diseases, viral diseases and bacterial diseases.

(iii) Training of public health medical and para-medical personnel need be given the highest priority.

(iv) There is need for further development of training of health educators, as well as training of personnel in health information system.

(v) The centres of preventive and Social medicine at this level will be the sub-units of the Epidemiology Bureau functioning at the State level. Their functions will be (a) to provide training in preventive and social medicine, (b) to monitor all preventive services to the population (c) research, since the communicable disease are still a major cause of morbidity and mortality. This, will, therefore, continue to be a mojor field of biomedical research even in the years ahead.

11.4.1 Available facilities of epidemiology training

— Social and Preventive Departments of Medical Colleges all over India.

— National Institute of Communicable Diseases, Delhi. This Institute is offering epidemiological courses in different disciplines of communicable diseases.

— All India Institute of Hygiene and Public Health, Calcutta.

— Many public health Institutes, in India

— ICMR Institutes

Some of the ICMR Institutes are offering training and courses in epidemiology.

(i) National Institute of Cholera and Enteric Diseases, Calcutta, with collaboration of DGHS and financial and technical assistance from W.H.O. The institute is offering epidemiological courses on diarrhoeal diseases in different state health Departments for medical and para-medical staff.

(ii) National Institute of Virology, Punc.

(iii) Vector Control Research Centre, Pondicherry.

They are offering epidemiological courses on filarial diseases for medical and paramedical staff.

(iv) An advanced centre for clinical Epidemiology Research and Training (ACCERT) was set up in 1985 in collaboration with the Tamil Nadu Government at Madras Medical College and the

Institute of Child Health, Madras for training physicians in clinical epidemiology of tuberculosis, leprosy etc.

(v) The Council's Institute for Research in Medical Statistics, at Delhi and Madras conduct courses, regularly on medical bio-statistics. They also organize refresher courses for in-service statisticians.

11.5 Need for integrated development of teaching and practice of epidemiology.

It is common knowledge that the existing system of medical education does not prepare the right type of personnel needed for national programme of health services. There is a need for intgrated aproaches for teaching of epidemiology both for medical and non-medical personnel. This calls for formulation of an appropriate plan for. Modefication of training curriculum and methodology in the light of national health policy guideline.

11.6 Scope for improvement.

There is an immediate need for augmenting ttae facilities for training and modiflcation of training and curriculum in epidemiology to meet the increased demand arising from national health policy decision. Following suggestions are put forward on this count.

— National Board of Examinations has discontinued holding examination for award of MNAMS in Epidemiology. This should be restarted.

— More Universities should offer courses in DPH/MPH

— There is a need to reorient under graduate medical education to the needs of the country, with emphasis on community rather than on hospital care.

— Government have also stressed the need to improve the delivery of health services by better trained and more qualified personnel working under the supervision of fully equipped medical doctors.

12. LABORATORY SERVICES IN EPIDEMIOLOGICAL SURVEILLANCE

*Dr. Rajesh Bhatia**

12.1 Epidemiological Surveillance

Epidemiological surveillance of disease is the continuing scrutiny of all aspects of the occurance and spread of a diseases those are pertinent to effective control. It is a dynamic process involving the ecology of the infectious agent, the host, the reservoirs, the vector and the environment as well as the complex mechanism concerned in the spread of the infection and the extent to which the spread occurs. Epidemiological surveillance provides a basis for national preventive and control measures with reference to a particular disease. Epidemiological surveillance includes systematic collection and evaluation of morbidity and mortality reports, reports of investigations of epidemics, identification of infectious agents by suitable laboratory tests, availability, use and untowards effects of biologicals, insecticides and other materials used in control, immunity status of population and other relevant data.

12.2 Drawbacks of data based on clinical features only

In the past, epidemiological surveillance of communicable diseases was mostly based on morbidity and mortality statistics. These reports were mainly based on clinical diagnosis alone. No doubt these reports were useful but in the light of modern development and knowledge they seem to be far too unreliable. For example, a number of diseases may have similar clinical manifestations and it may not be possible to pinpoint the correct aetiological diagnosis. The same diaease may have different manifestations in different idividuals depending on immune status and other factors. Included in this also a sizably large number of cases of inapparent infection which go undetected. In Japanese encephalitis, it is estimated that for every overt case of the disease there may be 300-1000 cases of inapparent infection. A number of disease causes serious disabilities but as they do not not appear in the mortality statistics, thereby undermining the importance cause death, these do of the disease. Thus, morbidity and mortality returns based on clinical features alone would be unreliable.

Utility of laboratory in epidemiological surveillance.

The introduction of laboratory techniques in epidemiological services has revolutionised the concept as well as the scope of epidemiology. These

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have helped in following up specific diseases and infections and keeping track of the circulation of the aetiological agent in man, vectors, reservoirs etc. Laboratory techniques have provided more reliable data regarding morbidity and mortality statistics and have also helped in the planning as well as evaluation of control measures taken. Today, it is well understood that mere absence of overt cases of diseases in a community does not award it a disease free status. Till the etiological agent is lurking somewhere, the control measures have to be continued as for ultimate eradication of its causative agents. This is particularly important in case of diseases with foci of infection eg. Plague, arbovirus infections etc. However plague has reappeared in areas after a sufficiently long period of 7-10 years and even more. The infection is understood to be lurking in the sylvatic or wild rodent foci from where it spread to human settlements when circumstances favoured a spread.

Health laboratory services

Health laboratory service. groups all the laboratories used both in preventive and curative medicine, public health laboratories, hospital laboratories and other laboratories which in someway deal with the helth of the people of a community, whether considered individually or collectively.

Scope and functions of health laboratory services

The scope and functions of health laboratory services may be as follows :-

Microbiological services

The services cover the field of bacteriology, virology, mycology, parasitology and relevant serology as applied to :

1. Diagnose established infectious diseases.
2. Control treatment.
3. Indicate when a patient is free of infection and therefore no more a danger to the community.
4. Detect carriers who are so important in the spread of many infectious diseases.
5. Ascertain precise nature of infective agents circulating in a community.
6. Ascertain the extent of immunity to a particular agent in a communty.

(2) **Entomological services**

This is required for the detection and exact identification of arthropod vectors of disease, study of distribution of various infective agents in such vectors study methods of vector control etc. so that best type of campaign could be adopted to disease control or eradiction.

(3) **Pathological Anatomy Services**

These services are required for performance of routine autopsies and for provision of a diagnostic histopathological service and also exfoliative cytology.

(4) **Haematological & Blood Transfusion Services**

This is for performance of all kinds of haematological tests and to carry out all laboratory investigations connected with blood transfusion and also for the preparation and control of human blood products.

(5) **Biochemical service**

This is required to conduct biochemical tests for diagnosis, assessment and control of a disease. These services are also required for the control of chemical hazardous to the environment.

(6) **Biophysical service**

This is required for the detection of radio-activity and ionising radiations, for the control in the use of isotopes and for the control of the environment.

(7) **Hygiene laboratory service**

These are required for quality control of water supplies, dairypro ducts, air pollution, industrial hazards etc.

(8) **Physiological and Nutritional Laboratory Services**

These are to investigate dietary deficiencies and to determine the nutritional value of various food stuffs in common usage.

(9) **Production Laboratory**

These are for the production of various biological preparations for the prevention and treatment of disease, manufacture of vaccines, toxoids, antisera, standardised antigens and diagnostic antisera etc.

(10) Quality control of Pharmaceutical preparations

These services are meant to ascertain whether drugs used in the country comply with the national requirements.

(11) Control of Biologicals

This service is meant for the biologicals and chemicals used in testing of human blood products, vaccines, toxoids and therapeutic antisera for their purity, safety and potency.

(12) Forensic service

This may include service for medico legal autopsies, medical laboratory examinations, toxicological analyses and may be a part and parcel of are appropriate technical sections.

Role of Health Laboratories in Epidemiological Services

Health laboratories are important from public health point of view and concerned with :-

(i) Collecting and evaluating epidemiological data, notification of infectious diseases based on results of microbiological investigations and dissemination of epidemiological information.

(ii) Epidemiological investigations in the field, control of epidemics, carrier detection and charting of the disease in place and time.

(iii) Study of changing patterns of infectious diseases, spread of etiological agents and the immunological responses thereto in the human and animal population.

(iv) Organization of controller field trials for evalution of different prophylactic measures.

(v) Application of epidemiological methods to the study of non-infectious diseases in close collaborations with other disciplines of medicine.

(vi) **Teaching and Training.**

This involves teaching and training of personnel.

(vii) **Research.**

ORGANISATION OF LABORATORY HEALTH SERVICES

Laboratories would need to be provided at all levels of health care. The following laboratories may be identified/established :-

A. Central laboratories

One central laboratory or a number of zonal laboratories may cater to the needs of the states and provide the following services for the whole country.

1. To serve as reference laboratories.
2. To co-ordinate the work at State laboratories.
3. To procure and Supply special reagents and biologicals.
4. Standardisation of recording & reporting procedures.
5. To carry out epidemiological surveys whereever needed.
6. Training of people through training courses, workshop, seminars etc.
7. To keep liaison with laboratories in other countries.

B. State Laboratories

One State or a few regional laboratories may provide the following functions :

1. Co-ordination of the work of district laboratories.
2. Storage and supply of essential reagents/equipment to district laboratories.
3. Collection and analysis of data.
4. Epidemiological investigation of deseases.
5. Training of personnel.
6. Provide diagnostic/referral services to the State.

C. District Laboratories

The district level laboratories may provide the following functions :

1. Co-ordinate the work of PHC level laboratories.
2. Provide diagnostic facilities to the district.
3. Carry out investigations for surveillance and control of communicable diseases.
4. Maintain liason with the state and control laboratories.
5. Supply reagents etc. to PHC level laboratories.

D. Primary Health Centre Laboratory

The functions are ;

1. To provide basic diagnostic facilities of a limited nature.
2. To collect specimens for various investigations and despatch them to district or regional laboratories.
3. Maintenance of records.

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1. To provide basic diagnostic facilities of a limited nature.
2. To collect specimens for various investigations and to despatch them to district or regional laboratories.
3. Maintenace of records.

Laboratory Health Services at the District level

Establishment of laboratory services at the district level would be extremely advantageous as it would improve the quality and efficiency of primary health care. A correct and early diagnosis would ensure most suitable treatment for the patient and in many cases, the need for future hospitalisation may be avoided, reducing the cost of health care delivery. Laboratory support can also help in the decision whether to refer to a person to the state hospital or medical college.

Pre-requisites for reliable laboratory reporting

The report of the laboratory entirely depends upon the quality of the specimen submitted for analysis. Following precautions must be observed before planning to send morbid material for diagnosis.

(a) Choice of specimen

Collect material that will yield the suspected organisms or that will show antibody changes in the patients' blood e.g. for diphtheria organisms collect both nose and throat swabs.

(b) Approriate time for collection of samples

It is very essential for correct reporting. Examples are : for blood culture collect blood during the first few days of the illness and before the administration of any antibiotic.

(c) Proper handling of specimen

Collect the sample in the appropriate amount e.g., for blood culture at least 10 ml should be taken and for stool, sample of the size of a garden pea is sufficient.

If specimen should be in some kind of medium, be sure that it is put in the correct medium and all precautions taken for its proper transporation to the laboratory.

A detailed proforma (request Form) must accompany the specimen. The specimen itself should be appropriately labelled.

Though the laboratory plays a very important role in epidemiological surveillance, it, by no means, is free of certain inherent limitations. The

laboratory tests are only tools to increase the information on which physician or public health man bases his diagnosis. The laboratories only report their findings e.g. '.....diphtheria like bacilli seen.....' but do not interpret the findings. The establishment of diagnosis in many instances may not be within the perview of district laboratories. In such cases state, referral or national laboratories may be approached. A lot of time is, thus, spent in getting the final laboratory report. Neverthless time taken by laboratory tests is well-spent because :

1. Even delayed laboratory reports are of value in guiding treatment of some diseases such as : tuberculosis, syphilis and reported attacks of streptococcal infection.

2. Laboratory tests may indicate that treatment, started at once because a certain disease is suspected (as in the case of expsoure to rabies) should, or should not, be continued.

3. Although it may be impossible to treat first cases on the basis of laboratory findings, treatment or management of later cases in epidemics may be modified by laboratory confirmation of the diagnosis of the earlier cases.

4. Laboratory confirmation of diagnosis (when possible) is essential in arriving at an unqualified diagnosis upon which effective control measures can be based on epidemic situations.

In conclusion, it can be said that the laboratories can help a lot in effective epidemiological surveillance provided the laboratory is fed the proper material for analysis.

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